International Boundaries Research Unit

MARITIME BRIEFING

Volume 3 Number 3

Developments in the Technical Determination of Maritime Space: Charts, Datums, Baselines, Maritime Zones and Limits

Chris Carleton and Clive Schofield

Maritime Briefing

Volume 3 Number 3
ISBN 1-897643-45-4
2001

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Charts, Datums, Baselines and Maritime Zones

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i Based on Francalanci and Scovazzi, 1994: 3.

ii *Ibid.*: 7.

iii International Hydrographic Organization (IHO), 1993: 48.

iv Beazley, 1994: 24; IHO, 1993: 41.

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vi Reproduced by kind permission of the National Topographic/Hydrographic Authority, Wellington, New Zealand.

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Developments in the Technical Determination of Maritime Space:
Charts, Datums, Baselines, Maritime Zones and Limits

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1. Introduction

The concept of controlled seas and by implication some form of maritime zone was first developed in the Papal Bull of Pope Alexander VI in 1494, when Portugal declared all the oceans to the east of a meridian of longitude drawn through Brazil were Portuguese and those to the west remained Spanish (see Figure 1).[1] Similar early efforts to assert national sovereignty over offshore areas included James I of England's proclamation on 1 March 1604 of the 'King's Chambers' which enclosed the coastal waters of England between some 27 headlands (see Figure 2) and the claim of Gustavus Adolphus of Sweden to tolls for non-Baltic State vessels to trade within the Baltic.

In the seventeenth century a debate ensued between those advocating freedom of navigation and the right to trade and those who favoured coastal state jurisdiction over sea areas adjacent to its coast.[2] These contending positions are exemplified by Hugo de Groot's (Grotius) famous chapter *Mare Liberum* ('free sea') in his book *De Domino Maris* of 1604, and John Seldon's *Mare Clausum* ('closed sea') published in 1635. The consequence of this debate was the eventual emergence of two key principles in the law of the sea – state sovereignty over the territorial sea or 'small sea' close inshore and freedom of navigation on the 'high seas'.

Despite early efforts to bring the oceans under national sovereignty, however, up to World War II, state jurisdiction rarely extended beyond three nautical miles (nm)[3] from the coast. The post-war period has, however, witnessed a tremendous increase in the extent of maritime space subject to some form of coastal state control and responsibility – particularly through the emergence of concepts such as coastal state rights over the continental shelf and the exclusive economic zone (EEZ). As a direct consequence of the extension of coastal state sovereignty seawards, the number and length of potential maritime boundaries has increased significantly and, inevitably, the scope for overlapping claims and maritime boundary disputes has similarly increased.

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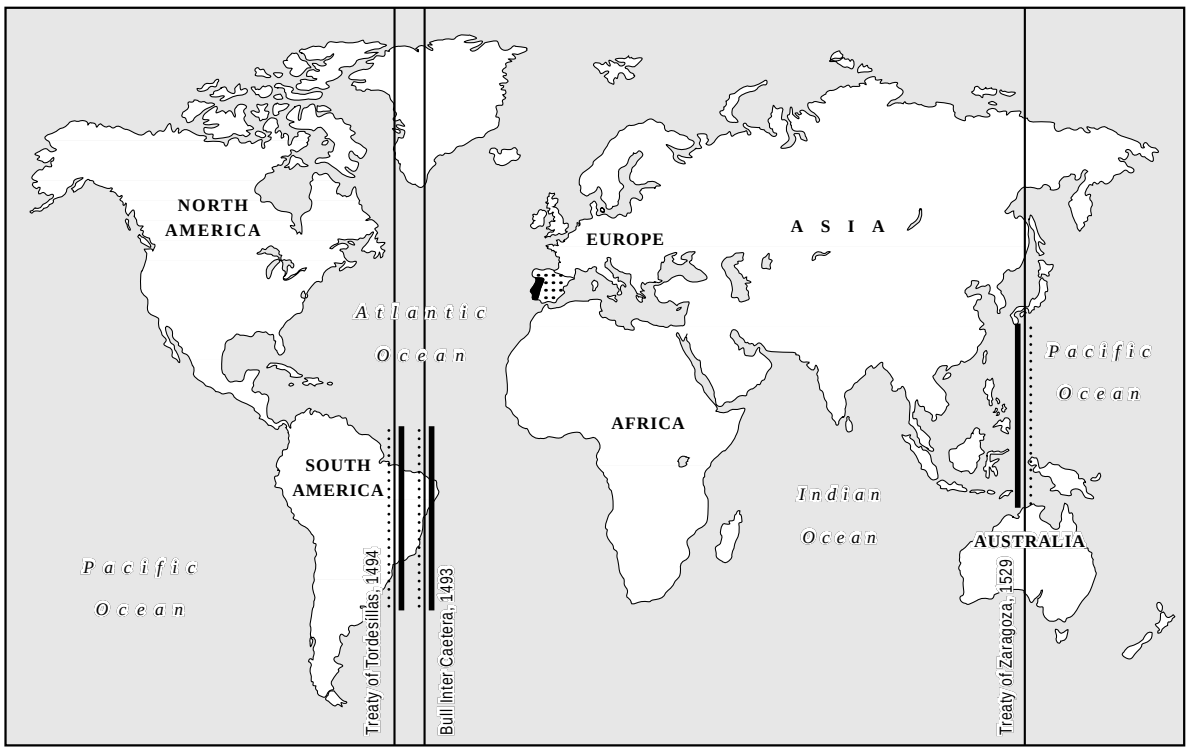
1 By the Bull *Inter Caetera* of 4 May 1493, Pope Alexander VI granted to the Spanish king and queen all the islands and mainlands found and to be found beyond a line drawn from pole to pole at a distance of 100 leagues west of the islands of the Azores and Cape Verde, provided that these territories were not in the actual possession of any other Christian king or prince as of 25 December 1492.

Subsequently, on 7 June 1494, Portugal and Spain signed the *Treaty of Tordesillas* which defined the boundary dividing their possessions as a line drawn pole to pole 320 leagues west of the Cape Verde islands. This arrangement was amended by means of the *Treaty of Zaragoza* of 22 April 1529 whereby Spain sold Portugal the Moluccas islands for 350,000 ducats. As a result of this another line was drawn in the eastern hemisphere (Francalanci and Scovazzi, 1994: 2-5).

2 This debate is well documented in O'Connell, 1982.

3 Some experts maintain that the correct abbreviation for a nautical mile is 'M' and that 'nm' should only be used for nanometres. However, 'nm' is widely used by many authorities (for example the US Department of State, the UN Office of Ocean Affairs and the Law of the Sea, and the UK Hydrographic Office) and appears to cause less confusion than 'M', which is often assumed to be an abbreviation for metres.

Figure 1: The Division of the Oceans between Portugal and Spain



The international law of the sea has been progressively clarified and codified particularly through the four Geneva Conventions of 1958[4] and their successor, the United Nations Convention on the Law of the Sea (UNCLOS). These legal instruments provide the framework for national claims to jurisdiction over maritime space, the delimitation of maritime boundaries and the management of the seas and will therefore be referred to extensively throughout this study.

Despite the considerable progress that has been made in the development of the law of the sea, it is nevertheless true that the Conventions mentioned only provide a framework for maritime claims, jurisdiction and boundaries. Thus ample scope remains for differing interpretations of certain provisions of the law of the sea and, therefore, dispute among coastal states. Furthermore, many questions of a technical nature are raised in this context.

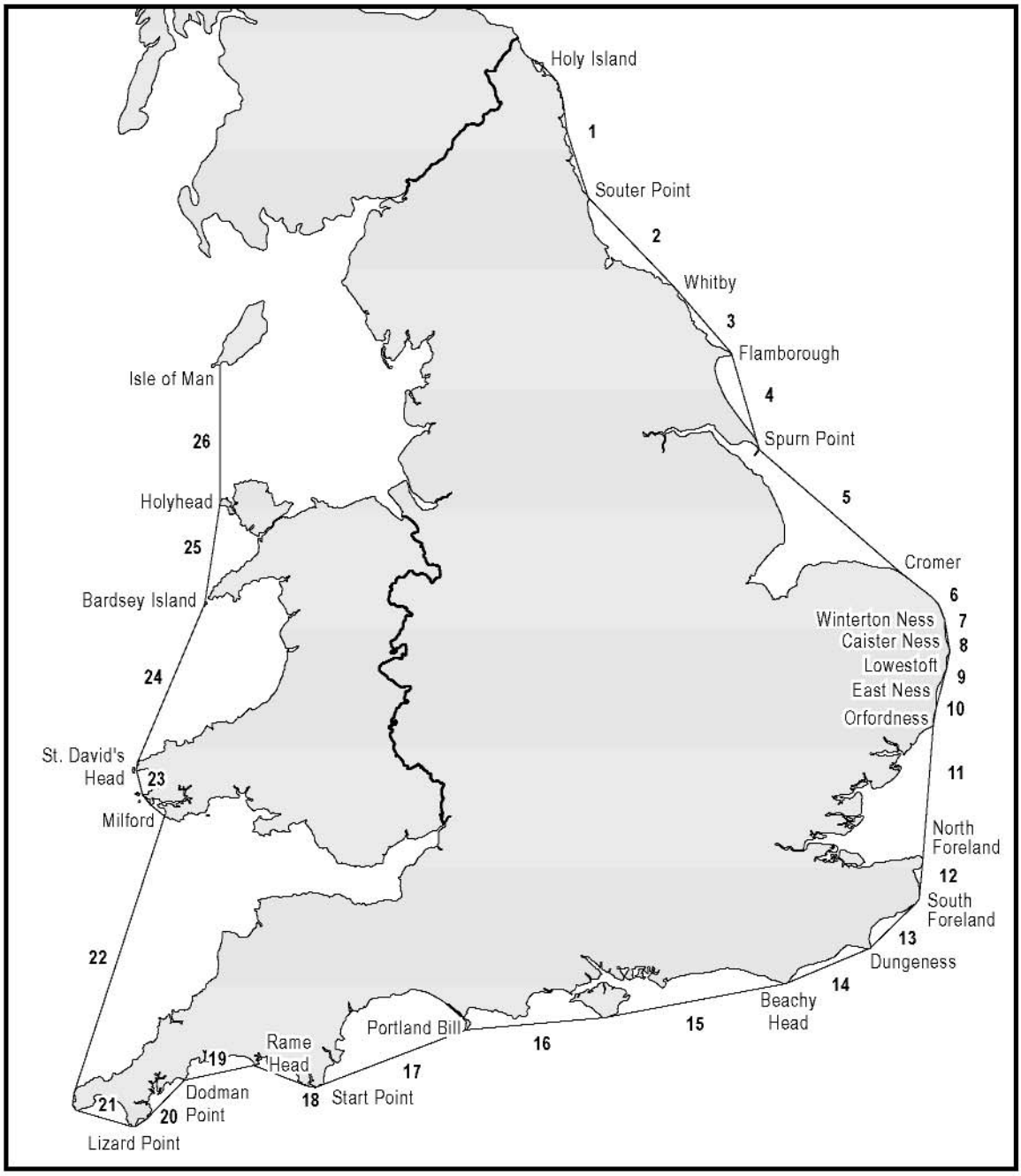
This *Briefing* represents part one of a two-part overview of the technical considerations that have to be addressed in the determination of maritime space. In practice, however, it is difficult to disentangle the purely technical from the legal. An appreciation of the legal framework is therefore essential to an understanding of the technical challenges and legal issues will also be considered here, albeit from a technical perspective. [5]

Chart projections and datums are introduced together with the meaning of a 'straight line'. The use and abuse of nautical charts is discussed. Even though it is now acknowledged that the use of a chart or map in isolation to delimit maritime space in a traditional, graphic way is not acceptable, their use as a pictorial illustration of the space being claimed or delimited remains very important. Consideration is given to the determination of baselines, including the

4 The Convention on the Territorial Sea and Contiguous Zone, the Convention on the Continental Shelf, the Convention on the High Seas and, the Convention on Fishing and Conservation of the Living Resources of the High Seas.

5 Beazley, 1994: 1.

Figure 2: The King's Chambers



importance of the vertical datum. The generation of maritime zones is then described covering all areas from internal waters to an extended continental shelf. The concluding part of the *Briefing* deals with the definition of the limits of these zones of maritime jurisdiction.

A second *Briefing*, complementary to this one, considers the delimitation of maritime boundaries, the vexing question of the regime of islands, the use of GIS (Geographical Information Systems) applications in the calculation and depiction of maritime space and the role of the technical expert in maritime boundary negotiations.

2. Technical Considerations concerning the Generation and Delimitation of Maritime Space

This section provides a introduction and guide to key technical issues in the generation and the delimitation of maritime space. Among these considerations, which are fundamental to an understanding of the delimitation process, are the question of coordinates, datums, 'straight' lines and charts. In addition, sources of technical information and a framework for model maritime zone legislation are dealt with here.

2.1 Coordinates and Datums

The use of geographic coordinates of parallels of latitude and meridians of longitude in defining maritime space is very common. Coordinates are used in both the definition of the outer limits of maritime areas and the definition of the turning points of maritime boundaries. However geographic coordinates on their own are meaningless. To become meaningful they have to be referred to a geodetic datum to set them down on a model of the Earth's surface. Before considering datums, however, the relationship between the Earth's surface, the geoid and an ellipsoid needs to be addressed. Figures 3 and 4 illustrate the difference between these three surfaces.

Figure 3: A Model of the Earth

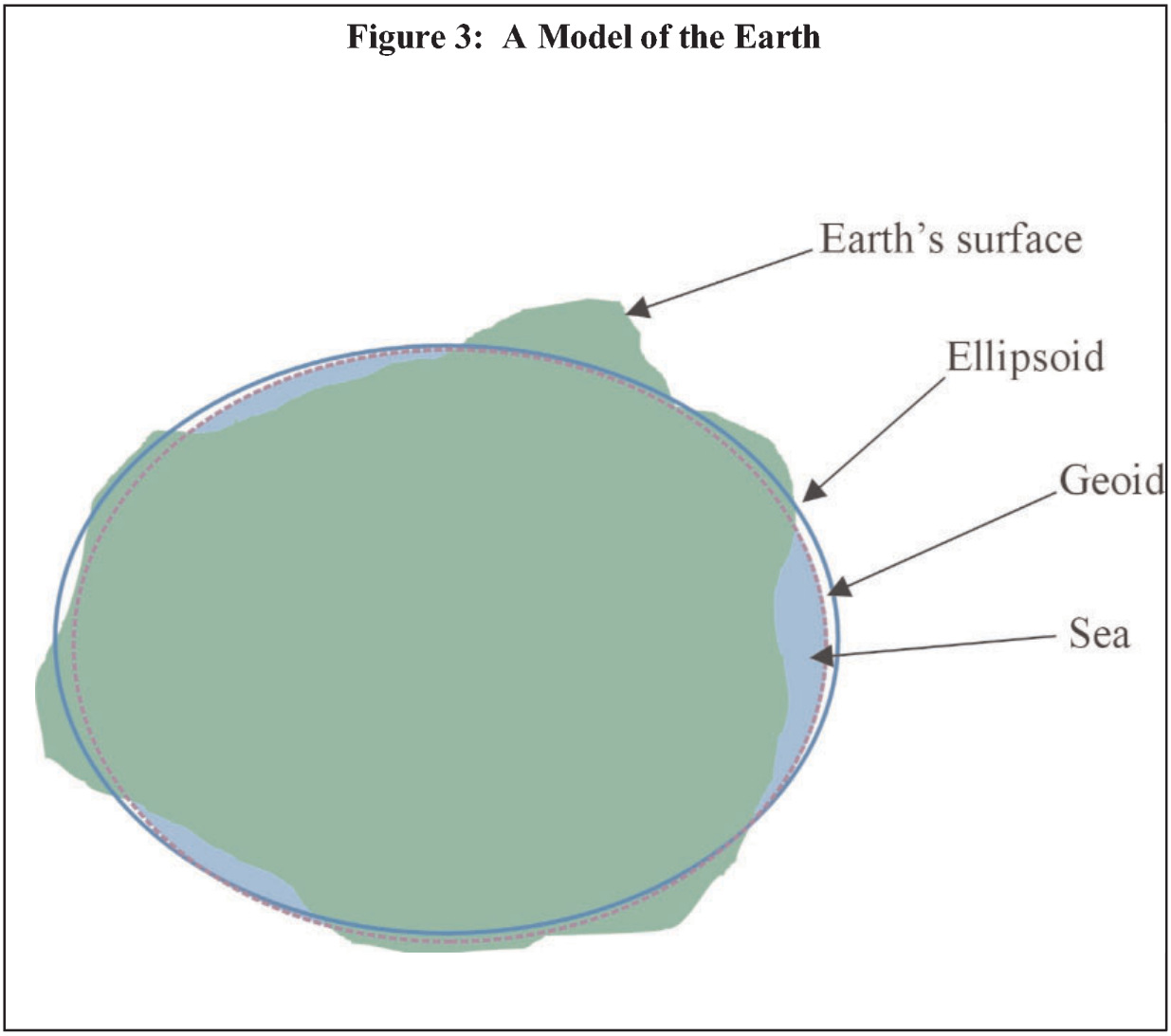


Figure 4: Geodetic Representation of a Section of the Earth

The Geoid

The Geoid is a term used to define the shape of the Earth's surface. It equates to approximately the mean sea level of the oceans and is influenced by the combined effects of the Earth's mass attraction and the centrifugal force of the Earth's rotation. It is thus not a smooth figure but rather undulates in height under these influences. These undulations can reach a height difference of up to 100 metres, compared to the mathematical shape of the earth, the ellipsoid.

The Ellipsoid

The geoid being a highly irregular shaped surface cannot be defined by a simple mathematic expression. It is therefore necessary to use a geometric shape for geodetic and mapping purposes, designed to be a close approximation of the shape of the geoid. An ellipsoid is defined by semi-minor and major axes. The difference between them gives the mathematical figure its 'flattening' characteristic.[6]

[6] A list of ellipsoids is included in the International Hydrographic Organization's *Manual on Technical Aspects of the United Nations Convention on the Law of the Sea – 1982* (TALOS) (1993: 51-52) and is

Geocentric Horizontal Datum

The geodetic ellipsoid is often used as a reference for horizontal positions in terms of latitude and longitude. In this context the ellipsoid becomes known as a geocentric horizontal datum. The advent of dedicated geodetic satellites has enabled the calculation of an accurate global datum, first using the Transit series of satellites and more recently the Global Positioning System (GPS) series.

The first global datum was defined in 1960 by the United States and was known as the World Geodetic System 1960 (WGS 60). It provided for the first time a truly geocentric worldwide coordinate system for global mapping, charting and navigation. The system is being refined continuously, the most recent version being WGS 84. The International Hydrographic Organization has adopted this system for all nautical charts. This will mean that in time all geographical positions concerning maritime space will be referred to a World Datum.

Local Datums

Until the advent of global datums many local datums were in use throughout the world. In some areas they are still in use today and many older treaties and national legislation still refer to these local datums. In order to reach the closest fit in a local area of interest between the geoid and the ellipsoid, many countries have developed a geodetic datum establishing the location of the origin and the ellipsoid in use for that area. Adjacent and opposite coastal States may use different local datums, and as a consequence the use of coordinate systems, based on these different datums, may well result in specific points shown on charts being assigned different values of latitude and longitude. These differences could have a significant effect on the positions. Many areas of the world have developed regional datums valid between several countries.[7] A list of some of these datums and the countries which have adopted them is provided below.

Europe

Most of the European countries, besides their national systems, relate their coordinated stations to the European Datum (ED-50) based on extended traverses and least square adjustments from an origin in Potsdam.

Successively a limited number of countries are redefining new standards.

Geodetic Datums	**Countries**
ED-50	Austria, Belgium, Denmark, Finland, France, Germany, Gibraltar. Greece. Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden. Switzerland.
ED-87(UK)	Austria, Finland, Italy, Netherlands, Norway, Spain, Sweden, Switzerland.

North America

The North American Datum 1927 (NAD-27) was based on triangulation with the origin at the Meade Ranch-Kansas. North American Datum 1983 (NAD-83) was defined as a geocentric

reproduced here as Appendix 1. The list was, however, complied from several different sources and should only be used as a guide as it is neither exhaustive nor authoritative.

7 A list of these datums and the countries which have adopted them is contained in the IHO's TALOS Manual (1993: 54-57).

system, compatible with the TRANSIT satellite system, and, for all practicable purposes is identical to the Geodetic Reference System (GRS-80) and the World Geodetic System WGS-84).

Geodetic Datums	**Countries**
NAD-27	United States (CONUS), The Bahamas, Canada, Caribbean, Central America, Mexico.
NAD-83	United States (CONUS), The Bahamas, Canada, Caribbean, Central America, Mexico.

South America
The Provisional South American 1956 was the first common datum established in the region. Subsequently the South American Datum, SAD-69, was defined with the origin in Chua (Brazil), but it is not yet completely implemented.

Geodetic Datums	**Countries**
Provisional SA-56	Bolivia, Chile, Colombia, Ecuador, Guyana, Peru, Venezuela.
SAD-69	Argentina, Bolivia, Brazil, Chile, Colombia, Ecuador, Guyana, Paraguay, Peru, Venezuela, Trinidad & Tobago.

Africa
In Africa there are three main datums implemented: ADINDAN, ARC 1950 and ARC 1960. An African system, ADOS, exists but it is not yet in use.

Geodetic Datums	**Countries**
ADINDAN	Ethiopia, Mali, Senegal, Sudan.
ARC 1950	Botswana, Lesotho, Malawi, Swaziland, Zaire, Zambia, Zimbabwe.
ARC 1960	Kenya, Tanzania.

Asia
The Indian Geodetic System is implemented in a large area of Asia, while in the Far East the TD(Tokyo Datum) exists.

Geodetic Datums	**Countries**
INDIAN	India, Bangladesh, Nepal, Thailand, Vietnam.
TD	Japan, Korea, Taiwan.

Australia
The AGD 1966 and AGD 1984, are the Australian Geodetic Datums defined for Australia (including Tasmania).

To avoid any possibility of misunderstanding when carrying out maritime boundary delimitations, it is recommended that a common geodetic datum be adopted, and the transformation parameters necessary to convert from a local datum into a common datum, preferably a world geocentric datum, be agreed between the parties at an early stage of the negotiations.

The question of choice of vertical datum for charting and the fundamental importance of this to the determination of baselines is addressed in Section 3.1.

2.2 'Straight' Lines

An important consideration when defining a straight baseline system, or putting in place bay closing lines as well as defining a boundary between states, is to clearly specify the 'straight lines' that are to be used to join adjacent turning points, or bay closing line terminal points. Several different types of straight line have been used in boundary treaties and national legislation.

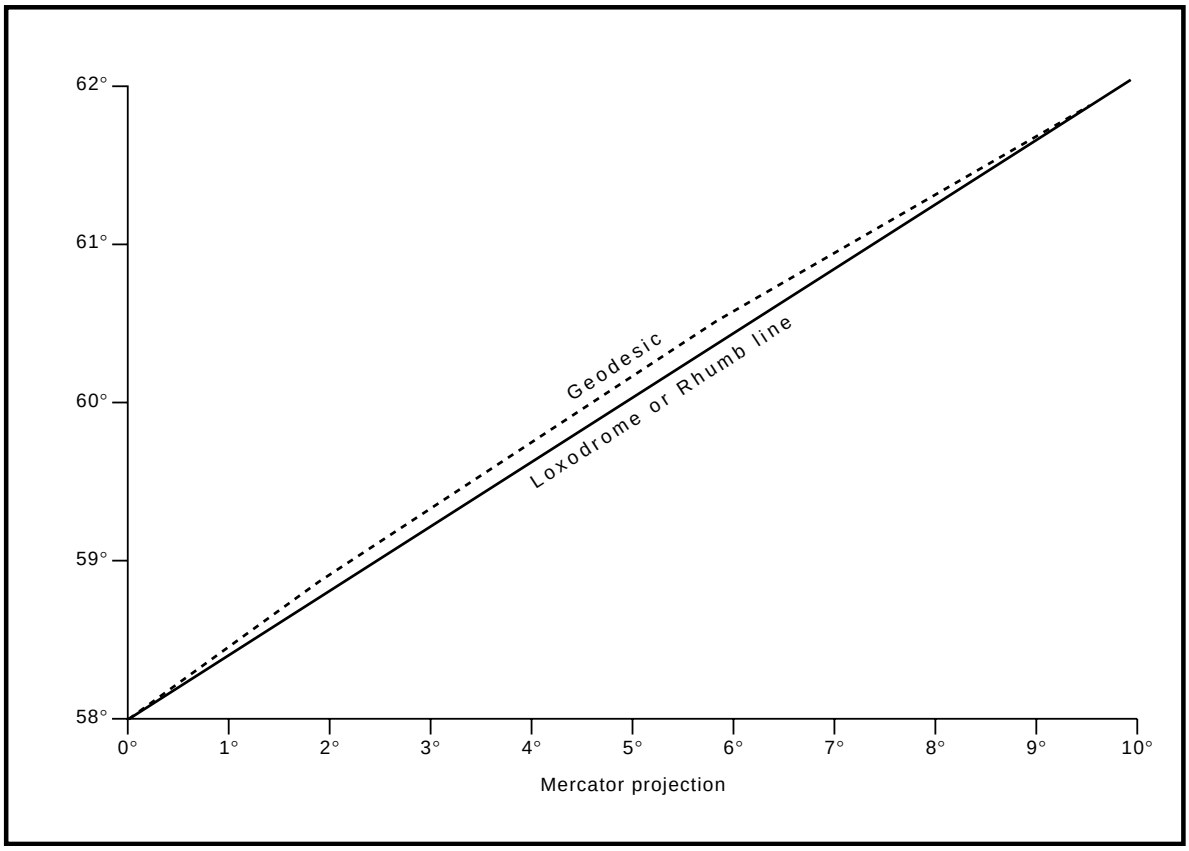
Geodesic
A Geodesic (or geodetic) line, is a curve giving the shortest distance between two points on a given reference ellipsoid. This is now the generally used 'straight line', when calculating lines joining boundary turning points, or calculating the distance between two points, as computer programs generally use the reference ellipsoid as the computing surface. This line will appear as a curved line on a Mercator projection.

Loxodrome/Rhumb Line
This is a real straight line on a Mercator projection. If this line is referred to a reference ellipsoid it will generally differ from a geodesic and will not be the shortest distance between two points on the ellipsoid. A loxodrome has a constant azimuth. The difference between a loxodrome and a geodesic can be significant depending upon the length of the line, the latitude and the direction (see Figure 5).

Great Circle
A great circle is defined as the intersection of a sphere and a plane through its centre. When a 'straight line' is defined as an arc of a great circle, it is a curve on a Mercator projection, which instead of assuming the Earth is an ellipsoid, assumes it is a sphere. The difference between a geodesic and a great circle is generally fairly small. The difficulty when using a great circle in a computer program is the figure used to define the centre of the Earth, which is assumed rather than mathematically defined as is the case of an ellipsoid.

Azimuth
An azimuth is a geodetic bearing coinciding with a loxodrome. Occasionally maritime boundaries are defined as an azimuth from a defined position. Azimuths may be defined by reference to true or magnetic north. The former is preferable as magnetic north gradually changes over time.

Figure 5: Comparison between a Loxodrome and a Geodesic



2.3 The Use and Abuse of Nautical Charts

The Definition of Charts

The required use of charts features strongly in both the 1958 Conventions and UNCLOS. However the term 'nautical' is not used, so what is meant by the term 'chart'? *The Hydrographic Dictionary* (IHO Special Publication, No.32) states:

> ***chart.*** *A special purpose MAP generally designed for NAVIGATION or other particular purposes. See CHART: NAUTICAL.*

One can deduce from this definition and the meaning of 'chart' in the Conventions, that the use of nautical charts is generally what is meant.

In the 1958 Convention on the Territorial Sea and Contiguous Zone, the use of charts is required in Articles 3, 4, 9 and 12 (emphasis added).

Article 3 states:

> *Except where otherwise provided in these articles, the normal baseline for measuring the breadth of the territorial sea is the low-water line along the coast as measured on* ***large-scale charts*** *officially recognized by the coastal State.*

Article 4(6) states:

> *The coastal State must clearly indicate straight baselines on* ***charts****, to which due publicity must be given.*

The last sentence of Article 9 states:

> *The coastal State must clearly demarcate such roadsteads and indicate them on **charts** together with their boundaries, to which due publicity must be given.*

Article 12(2) states:

> *The line of delimitation between the territorial sea of two States lying opposite to each other or adjacent to each other shall be marked on **large-scale charts** officially recognised by the coastal States.*

UNCLOS refines this requirement in recognition of the advances in technology and adds the option of defining straight baselines, mouths of rivers, bays, roadsteads and the delimitation of the territorial sea between States, as lists of geographical coordinates, specifying the geodetic datum, instead of depicting these limits on charts. However the requirement to use large-scale charts, recognised by the coastal State, for defining the normal territorial sea baseline remains.

Article 5 of UNCLOS repeats Article 3 of the 1958 Convention on the Territorial Sea and Contiguous Zone verbatim while Article 6 states:

> *In the case of islands situated on atolls or of islands having fringing reefs, the baseline for measuring the breadth of the territorial sea is the seaward low-water line of the reef, as shown by the appropriate symbol on **charts** officially recognised by the coastal State.*

This Article does not use the words 'large-scale' when describing charts. This may be an acknowledgement that many isolated coral islands do not have large-scale chart coverage and a coastal State may recognise a smaller scale chart or perhaps land mapping, as defining the outer edge of the reef line.

Article 16 states:

1. *The baselines for measuring the breadth of the territorial sea determined in accordance with Articles 7, 9, and 10, or the limits derived there from, and the lines of delimitation drawn in accordance with Articles 12 and 15 shall be shown on **charts** of a scale or scales adequate for ascertaining their position. Alternatively, a list of geographical co-ordinates of points, specifying the geodetic datum, may be substituted.*

2. *The coastal State shall give due publicity to such **charts** or list of geographical co-ordinates and shall deposit a copy of each such **chart** or list with the Secretary-General of the United Nations.*

This article gives a certain discretion on the scale of chart required. This seems to recognise that in most cases a list of geographical coordinates, referred to a geodetic datum, are likely to be the definitive documents defining the various limits of maritime jurisdiction. In this day and age, charts are generally only used as illustrative documents, when defining maritime limits and boundaries. As an example of this practice, Figure 6 illustrates the straight baseline system of the Falkland Islands/Islas Malvinas as shown on Admiralty chart D2512. However the definitive document is *The Falkland Islands (Territorial Sea) Order 1989*, which in the Schedule, (Figure

Figure 6: Straight Baselines around the Falkland Islands/Islas Malvinas[8]

[8] It is worth noting that the UK's straight baseline claim around the Falkland Islands has been subject to international criticism (see Roach and Smith, 1996: 121-122) and that Argentina, which contests sovereignty over the islands, termed the Islas Malvinas rather than the Falkland Islands, with the UK established its own version of straight baselines around the islands in 1991 (US Department of State, 2000: 6).

Figure 7: Schedule of UK Straight Baseline Turning Points for the Falkland Islands

SCHEDULE Article 3

POINTS BETWEEN CAPE CARYSFORT (EAST FALKLAND), CAPE PERCIVAL (WEST FALKLAND) AND MACBRIDE HEAD (EAST FALKLAND) JOINED TO FORM THE BASELINES

	Co-ordinates of latitude and longitude of Point		*Name of Feature*
	Latitude South	*Longitude West*	
1.	51° 24′ 49″	57° 50′ 52″	Cape Carysfort
2.	51° 30′ 38″	57° 44′ 11″	Volunteer Point
3.	51° 40′ 34″	57° 41′ 00″	Seal Rocks
4.	51° 43′ 41″	57° 44′ 22″	Wolf Rock
5.	52° 05′ 51″	58° 24′ 36″	Prong Point
6.	52° 27′ 00″	58° 53′ 33″	East Sea Lion Island
7.	52° 26′ 53″	59° 07′ 16″	West Sea Lion Island
8.	52° 23′ 48″	59° 43′ 25″	Barren Island
9.	52° 15′ 33″	60° 38′ 52″	Cape Meredith
10.	52° 10′ 11″	60° 56′ 07″	Bird Island
11.	51° 50′ 05″	61° 20′ 36″	Cape Percival
12.	51° 41′ 35″	61° 19′ 46″	Landsend Bluff
13.	51° 00′ 27″	61° 15′ 36″	Steeple Jason Islet
14.	51° 01′ 09″	61° 07′ 46″	Grand Jason NW Islet
15.	51° 01′ 30″	61° 05′ 34″	Grand Jason N islet
16.	51° 09′ 36″	60° 14′ 13″	Wreck Islands
17.	51° 12′ 28″	59° 54′ 58″	Government Island
18.	51° 13′ 49″	59° 46′ 23″	White Island
19.	51° 16′ 26″	59° 29′ 55″	Cape Tamar
20.	51° 13′ 59″	58° 57′ 56″	Cape Dolphin
21.	51° 17′ 52″	58° 27′ 42″	Cape Bougainville
22.	51° 21′ 40″	57° 56′ 46″	MacBride Head

The above positions are on Falkland Islands Datum (1943).

7) lists the geographical coordinates of the straight baseline system, referred to Falkland Islands Datum 1943.

Large-Scale Charts

What is meant by 'large-scale'? Most developed coastal States, with a charting capability, will have chart coverage of their coastal areas on scales between 1:50,000 and 1:100,000, with a few larger scale charts covering the approaches to, and plans of, the larger ports. Generally speaking, charts of 1:100,000 scale or greater can be considered to be 'large-scale' as it is possible, for example, to locate points to the nearest second of arc. Such charts are therefore suitable for deriving a coastal State's low-water line and thus its normal baseline (see Section 3.1). Charts also retain a role in maritime boundary delimitation.

Use of Charts in Delimitation

Prior to the advent of modern computer technology in the late 1970s the majority of maritime delimitations were carried out graphically, either using published navigational charts or on charts constructed specifically for the purpose. Indeed, even in some agreements which were concluded after the advent of computer technology, published charts appear to have played a significant role and several agreements actually have charts annexed to them depicting the agreed boundary. For

example, in the Andaman Sea, the Burma-Thailand boundary agreement signed in 1980, uses Admiralty charts 3052 and 830 for the definition of the turning points of the boundary and chart 830 was annexed to the agreement depicting the entire agreed boundary. The early United Kingdom agreements in the North Sea were all produced graphically on specially prepared charts. Close scrutiny of the agreed turning points of these equidistance boundaries will reveal that they are only quoted to the nearest 6 seconds of arc.

The lack of precision in these graphically produced boundaries is highlighted by the difference in position of the northern point of the Norway/United Kingdom continental shelf boundary, agreed in 1965 and the position of the southern point of the northern section of this boundary, agreed in 1978. The later boundary was computed, using the same basepoints as the 1965 agreement and the two positions should have been identical. However, a difference of 331 metres was apparent between the graphically produced position and the computed position. The original graphically produced position could not be adjusted because it formed part of an agreed treaty and was 'absolute' in law, so the solution was to join the two positions by a parallel of latitude 331 metres in length. The northern part of this boundary, signed in 1978, delimits the boundary by turning points quoted to 100th of a second of arc. This is, however, taking the faith in computer technology too far. Although the computer program used for the calculation could theoretically produce such precision, it would be very surprising if the precision of the territorial sea basepoints, used in this calculation, were of the same magnitude of precision. A computer calculation is only as good as the data inserted.

The modern practise of using charts in maritime delimitations should be for illustrative purposes only. The chart still plays an important part in the delimitation process, because the lawyers and politicians like to see a picture. Even the technical experts will use a chart in the first instance as a guide to the later computer calculations that will have to be carried out to produce a precise result. Charts can also be used as a useful tool for determining the general direction of coasts, coastal fronts, the geographical configuration of the area to be delimited and other general considerations that do not need the precision of computer calculations.

Chart Projections

The surface of the Earth, being a non-planar two-dimensional surface, cannot be depicted on a two-dimensional mapping plane without distortions. These distortions may occur in the depiction of distance, angles or shapes. Map or chart projections have been developed to minimise or eliminate as many of these distortions, over certain areas, as possible and the projection used depends on the specific requirement for a chart or map. No projection can retain all the terrestrial relationships exactly, so although one parameter may be true others will be distorted.

> **The Mercator** projection is commonly used because of the ease with which a navigator at sea can plot positions using this projection. The latitude and longitude graticules are depicted as straight lines so the use of a parallel ruler allows the navigator to plot a position without difficulty. It also has the property of depicting loxodromes as straight lines on the chart, which is of considerable benefit to the navigator. However, distances and areas become greatly distorted in higher latitudes and care must be taken when measuring distances from the latitude scale.
>
> **The Transverse Mercator** projection is a transverse cylindrical conformal projection, often used in larger scale nautical charts and land mapping. The distortion adjacent to the standard meridians of this projection is minimal.

Conformal projections preserve angles and the shape of areas and are suitable for areas between 4° and 72° latitude. However the scale of the projection is only true on the reference parallels. Lambert conformal projections were often used when delimiting boundaries graphically. However, their use today is probably only suitable when depicting a general geographical area, where it is important to show the true shape of land features throughout the area.

The Polar Stereographic projection is a special conformal projection for use north or south of the 80° parallel.

Chart Symbols

The system of chart symbols is agreed internationally and laid down in various International Hydrographic Bureau publications as follows:

Publication M-4	Chart Specifications of the IHO and Regulations of the IHO for International (INT) Charts.
Publication S-52	Specifications for Chart Content and Display Aspects of ECDIS Appendix 2: Colour and Symbols Specifications for ECDIS.

Hydrographic Offices, which publish navigational charts, also publish their own symbols and abbreviations. These should normally conform with the internationally agreed symbols and abbreviations, but will also include those which are different, perhaps because some of their charts are still published in the old style.

The UK Hydrographic Office publishes Chart 5011 (INT 1) – *"Symbols and Abbreviations Used on Admiralty Charts."* This publication lists all the symbols and abbreviations that can be found on Admiralty charts, both metric and fathom.

Scale and Measuring Distance

The scale of a chart is displayed within the title block. This indicates in the form of numbers the representation of the chart to the actual earth's surface. Thus a scale of 1:200,000 indicates that the image on the chart is 200,000 times smaller than the actual images on the ground.

The scale distortion over the chart will depend upon the projection being used and the accuracy of the printing procedure. Charts printed on a Mercator projection will have a true scale at a specified latitude. Distortions will occur the further away one goes from this latitude. Similarly on a Transverse Mercator projection the true scale is defined in bands of longitude called central meridians.

The measurement of distance on a chart will also depend on the projection used. The vast majority of navigational charts are on the Mercator projection. On this type of projection the latitude scale on the right and left hand side of the chart is used for the measurement of distance. Care must be exercised when taking a measurement off this scale as it is totally dependent on the latitude of the position for which the measurement is required. The latitude scale on a Mercator projection expands north and south of the equator, so when taking off a distance measurement, it should be done at the same latitude as the object to which the measurement is being taken. The distance measured will be in nautical miles at the latitude of measurement.

On large scale charts a scale bar will be displayed on the chart. This will display scales of nautical miles and cables, metres and kilometres and probably feet. These scales can also be used to measure distances on the chart.

Cartohypnosis

It has been observed that 'all maps are lies', that is, as two-dimensional representations of the complex three-dimensional (even four dimensional if one includes the dimension of time) world we live in, they necessarily do not tell the whole story. Maps inevitably lie. Indeed, as Mark Monmonier (1996: 1) has stated:

> *Not only is it easy to lie with maps, it's essential. To portray meaningful relationships for a complex, three-dimensional world on a flat sheet of paper or a video screen, a map must distort reality. As a scale model, the map must use symbols that almost always are proportionally much bigger or thicker than the features they represent. To avoid hiding critical information in a fog of detail, the map must offer a selective, incomplete view of reality. There's no escape from the cartographic paradox: to present a useful and truthful picture, an accurate map must tell white lies.*

On the same basis, can it also be said that all charts are lies? The answer is a qualified 'yes', though this does overdramatise the case somewhat. For example, maps can be manipulated in their construction – that is the projection, scale and colours used – and in terms of the information included – raising issues of selection, generalisation, simplification, symbolisation, exaggeration and displacement However, in the nautical context, as previously noted, the IHO sets standards relating to scale, projection and with regard to symbols, minimising the chances of deliberate distortion.

Nevertheless, it is well to realise that nautical charts are primarily designed for the navigator. Their objective is to provide for safety in marine navigation. Their use in a law of the sea context is, therefore, a secondary or subsidiary function and this should always be borne in mind.

In the context of third-party settlement[9] the case is rather different and the choice of maps and charts can be crucial. Maps are often specially constructed and manipulated to convey a particular point of view or support a particular argument. With this in mind, Lewis Alexander's comments on the maps used in the pleadings of the 1985 Guinea/Guinea-Bissau Arbitration are telling:

> [W]*e had with us at The Hague what I felt was a spectacular display of specially prepared maps, illustrating graphically the injustice which would be wrought on the people of Guinea, should the Court rule in favour of Guinea-Bissau's boundary claim.* […] *I personally believe that our cartographic materials* […] *may have helped our case considerably.* […] *Maps are by no means neutral. Different projections show different perspectives of reality. Notions of concavity and convexity of a coastline can be displayed through judicious selections of end points of a curving line. Certain colours can carry a particular message. All this is part of what a geographer* […] *referred to as 'Cartohypnosis'* .[10]

[9] See Section 5 in Carleton and Schofield (2001).

[10] Quoted in Antunes (2001).

2.4 Sources of Information

Nautical Charts

When the technical expert or researcher is looking for possible sources of information on the status of maritime coasts and insular formations he/she will naturally look for published nautical charts of the area in the first instance. These 'sea maps' are published by coastal states with a hydrographic capability and will almost certainly be the *"large-scale charts officially recognized by the coastal State"* as laid down in Article 5 of UNCLOS to define the coastal state's normal territorial sea baseline. Where a coastal state does not publish its own nautical charts it may well recognise charts published by one of the nations that provide worldwide coverage of charts. There are now only three nations that provide this coverage, the United Kingdom, the United States of American and Russia.

When using nautical charts, if the technical expert is not familiar with the symbols and abbreviations used on them he/she should have available the internationally recognised list of symbols and abbreviations used on nautical charts published by the International Hydrographic Organization (IHO) or by the major hydrographic nations mentioned above.

Sailing Directions

Sailing directions are a series of books, either published in hard copy, or progressively in digital format, that describe what is on the chart in words and give additional information not shown on the chart. These publications can be of considerable assistance to the technical expert or researcher to confirm the status of a feature such as a rock or low-tide elevation and in some cases help to determine sovereignty issues. These volumes have often been published continuously for several decades and early editions will be available for research purposes in national archives. The major hydrographic nations publish these volumes covering all the world's oceans and coastal areas. The United Kingdom Hydrographic Office for instance publishes a set of *Admiralty Pilots* in 74 volumes covering the world.

Other Sources of Information

If nautical charts and sailing directions either do not give enough information or are not available at a large enough scale to be of use, the technical expert may have to revert to large-scale land mapping of the coast. These may be published by the coastal state at a suitably large scale and be more up-to-date than the nautical charts of the area, which in all probability will have been produced by one of the nations publishing a world-wide nautical chart series, but not at a scale larger enough to be of use for the determination of the territorial sea baseline or other features that the technical expert or researcher is looking for. Other sources of information that should be considered are encyclopaedia, almanacs and major world atlases. Further information can often be found in national archives and the archives of internationally recognised research institutions and geographical societies.

2.5 Model Maritime Zone Legislation

Ideally model maritime zone legislation should be contained within one legislative document. As more and more coastal States are ratifying or acceding to the UN Convention on the Law of the Sea (UNCLOS), this type of legislation is beginning to become widespread.[11] Many are far from

[11] As of April 2001, UNCLOS had attracted 157 signatures whilst there had been 135 ratifications, confirmations, accessions or successions to it.

ideal and in some cases either lack important provisions or are not in accordance with the Convention.

Obviously each coastal State is unique and its maritime zone legislation will have to be modelled exclusively to the requirements of the particular circumstances appertaining to it. The legislation should contain details covering the following areas:

Definitions of terms used: territorial sea baseline; internal waters; territorial sea; contiguous zone; continental shelf; exclusive economic zone; foreign vessel; foreign state; archipelagic waters; archipelagic sealane; maritime areas; master in relation to a vessel; minister; nautical mile; and resources. This list is not exhaustive and a coastal state may wish to add further definitions of terms used.

Maritime Areas: territorial sea baseline; internal waters; archipelagic waters; territorial sea; contiguous zone; exclusive economic zone; continental shelf; maritime delimitation.

Rights in Respect of the Maritime Areas: sovereignty in respect of the territorial sea; sovereignty in respect of archipelagic waters; rights in respect of contiguous zone; rights in respect of EEZ and continental shelf; rights to lay submarine cables and pipelines; prohibited activities.

Innocent Passage, Transit Passage and Archipelagic Sealane Passage: interpretation; innocent passage; transit passage; archipelagic sealane passage; engaging in prescribed activities prohibited.

Charts and Geographical Coordinates: charts of maritime areas, or maps if charts are not available; evidence of charts or maps; publicity with respect of charts or maps, and the datum to which geographical coordinates are referred.

Jurisdiction of Courts and Other Legal Matters: jurisdiction; apprehension of certain offenders; arrest on board foreign vessels; certificate of maritime areas signed by the appropriate law officer; civil jurisdiction; civil jurisdiction in relation to foreign vessels; application of enactments to maritime areas.

Regulations: Any regulations quoted or referred to in the legislation must be either explained or given a reference.

Schedules: Schedules may be used to list amendments to previous acts and regulations; or list straight baseline or archipelagic baseline coordinates.

3. Defining Baselines

The significance of baselines lies in the fact that a state's rights to maritime jurisdiction, be it to territorial sea, contiguous zone, continental shelf, exclusive fishing zone or exclusive economic zone, are measured from such baselines, the outer limits of each of these zones being at a specified distance from the baseline. Correspondingly, baselines also represent the limit of a state's internal waters which lie landward of the baseline.

The establishment of baselines is a necessary precursor to the claiming of zones of maritime jurisdiction, as it is essential to determine the points from which the breadth of such zones are measured. An understanding of a particular state's baselines is therefore fundamental to the assessment of its maritime claims.

3.1 'Normal' Baselines

Article 5 of UNCLOS repeats Article 3 of the 1958 Geneva Convention on the Territorial Sea and Contiguous Zone almost verbatim and states:

> *Except where otherwise provided in this Convention, the normal baseline for measuring the breadth of the territorial sea is the low-water line along the coast as marked on large-scale charts officially recognised by the coastal State.*

This type of baseline, commonly referred to as the 'normal' baseline, is the predominant type of baseline claimed by states and is, in effect, a state's default baseline.

Defining the Normal Baseline

Provided the chart coverage of a coastal State's low-water line is relatively modern and of a large enough scale to be able to derive the territorial sea basepoints to the nearest second of arc, the requirements of Article 5 will be met. Scales smaller than 1:100,000 should not be used, if at all possible, for the determination of basepoints. If a particular part of a State's coastline is not covered by large-scale charts, reference to modern larger scale land mapping may be required.

Figure 8 is a copy of New Zealand Chart 86 of the Samoa Islands on a scale of 1:446,400. As can be seen there is a larger scale coverage to the approaches to Apia and a few large-scale plans of small harbours and anchorages, but the majority of the coast is only covered at 1:446,400. This scale is much too small for an accurate determination of the territorial sea basepoints in these areas. However, the whole of Western Samoa is covered by a relatively modern series of land maps on a scale of 1:20,000, which depict the low-water line of the fringing reefs. Figure 9 is a copy of the land map of Aleipata, at the eastern end of Upolu Island in Western Samoa, and the fringing reefs and coastline can be clearly defined from this map.

When using a land map to derive territorial sea basepoints, care should be taken to ensure that the coordinates derived from such a map are consistent with the points taken from large scale charting in other areas of the coastline. Land maps are rarely on the same projection as charts and will generally not have a full geographical grid from which to take off positions.

The best way of deriving positions from land maps is to read the positions as grid coordinates and then convert this position into geographical coordinates using a computer program. Care should also be taken that the geodetic datum of all the territorial sea basepoints is consistent. If the land maps are on a different datum to the charts, a transformation will be required. The final point to bear in mind is the vertical datum used in the land mapping. Most land mapping will depict the low-water line using a different datum than a nautical chart. In areas where the tidal range is a metre or less, the difference will probably be insignificant, unless the beach profile is very flat. If the beach profile is flat, or if there is a significant tidal range, the use of land maps to determine territorial sea basepoints is not recommended.

Where chart coverage and land mapping is insufficient for the determination of the territorial sea basepoints, processed satellite imagery can be used to determine a digital model of the low-water line. Modern satellite imagery, such as Landsat is not expensive and can produce an image to an accuracy of approximately ±30m without the need for any land survey effort. More expensive, but very much more accurate imagery is also now available in the public domain. Resolution of ±1m is available but this is considered too refined for baseline determination in most cases. Successful satellite imagery requires a clear view of the coastline with no cloud cover. In areas where cloud cover is prevalent the use of RADARSAT could be considered. This will provide an image through cloud cover to an accuracy of approximately ±100m provided the image can be geo-referenced to known objects on the ground. Digital imagery of this type can be imported directly into geodetically robust GIS systems for the determination of territorial sea basepoints.

Alternatively aerial photography can be commissioned, provided it has been taken at a known time and date and at low-water, preferably at the lowest low-water in the year. If sufficient photographic control points can be determined from the photographs, an accurate photo plot can

Figure 8: New Zealand Chart 86 – Samoa Islands

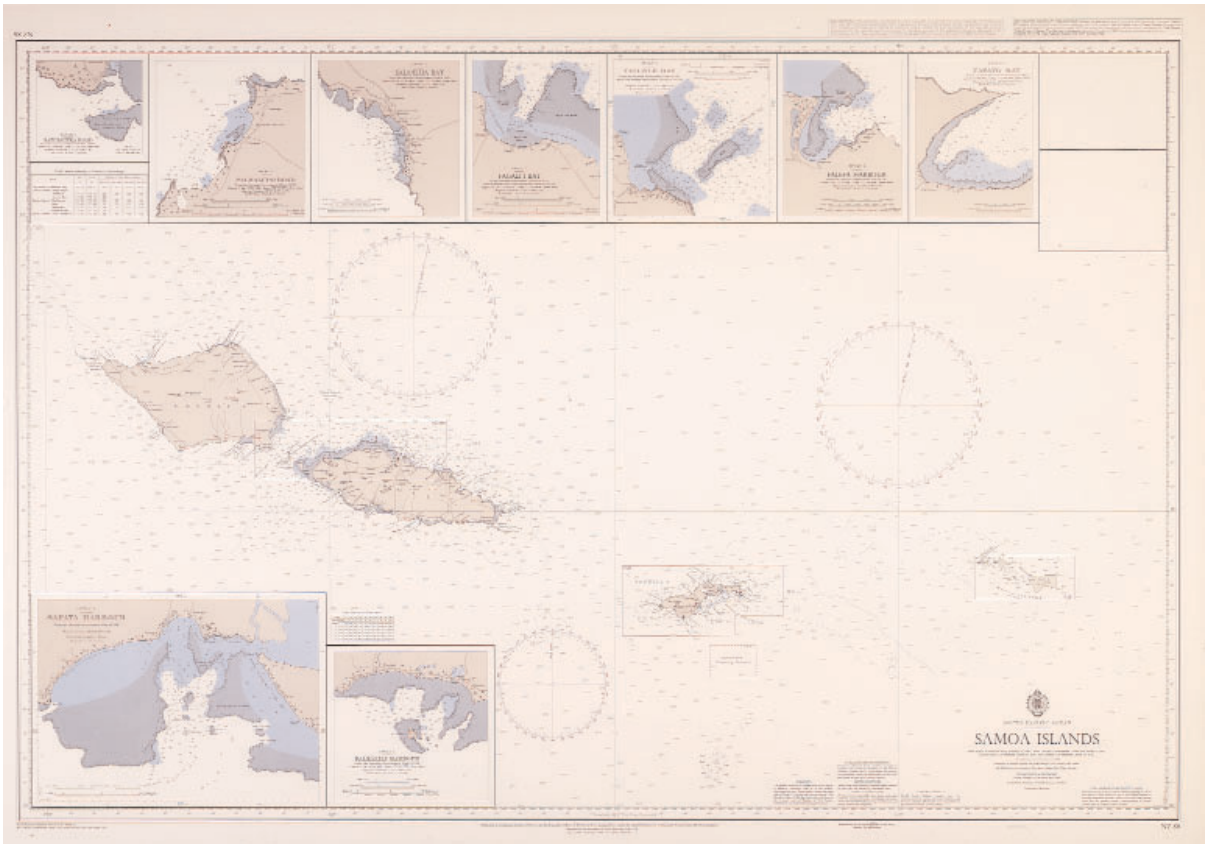


Figure 9: Land Map of Aleipata

be constructed depicting the low-water line on the scale of the photography. Territorial sea basepoints can then be derived from this plot.

The final, and expensive, option is to actually carry out a field survey to determine the basepoints. Although accurate positions can be determined very easily with the use of GPS satellite receivers, the main difficulty will be the occupation of the correct low-water line point. It is seldom possible to physically occupy a territorial sea baseline point, because the vertical datum used will probably only dry once every 19 years or so. Traditional surveying from sea in a small boat is seldom possible right up to the drying line, unless there is a significant tidal range and the surf conditions allow. The use of hovercraft is possible in areas, where the beach profile is shallow, provided it is safe to do so. Another option is to use laser technology from aircraft, this has been successfully pioneered by Australia. Some coastal States, namely Norway and Denmark, have derived the position of straight baseline turning points, located in particularly difficult areas, by using GPS receivers placed in helicopters and hovering the aircraft over the position with the receiver directly above the baseline point.

In any event, the technical expert, who is producing coordinates of territorial sea basepoints, will be deluding themselves if he/she considers that an accuracy of greater than one second of arc can be achieved in the majority of cases. A greater accuracy will be achievable if the actual basepoint can be occupied, but as discussed above, this scenario is unlikely. A greater precision is possible if a modern large scale chart is used to derive the basepoints. However the scale would have to be 1:20,000 or larger and the accuracy of the depicted low-water line would have to match this precision.

The Meaning of the Low-Water Line

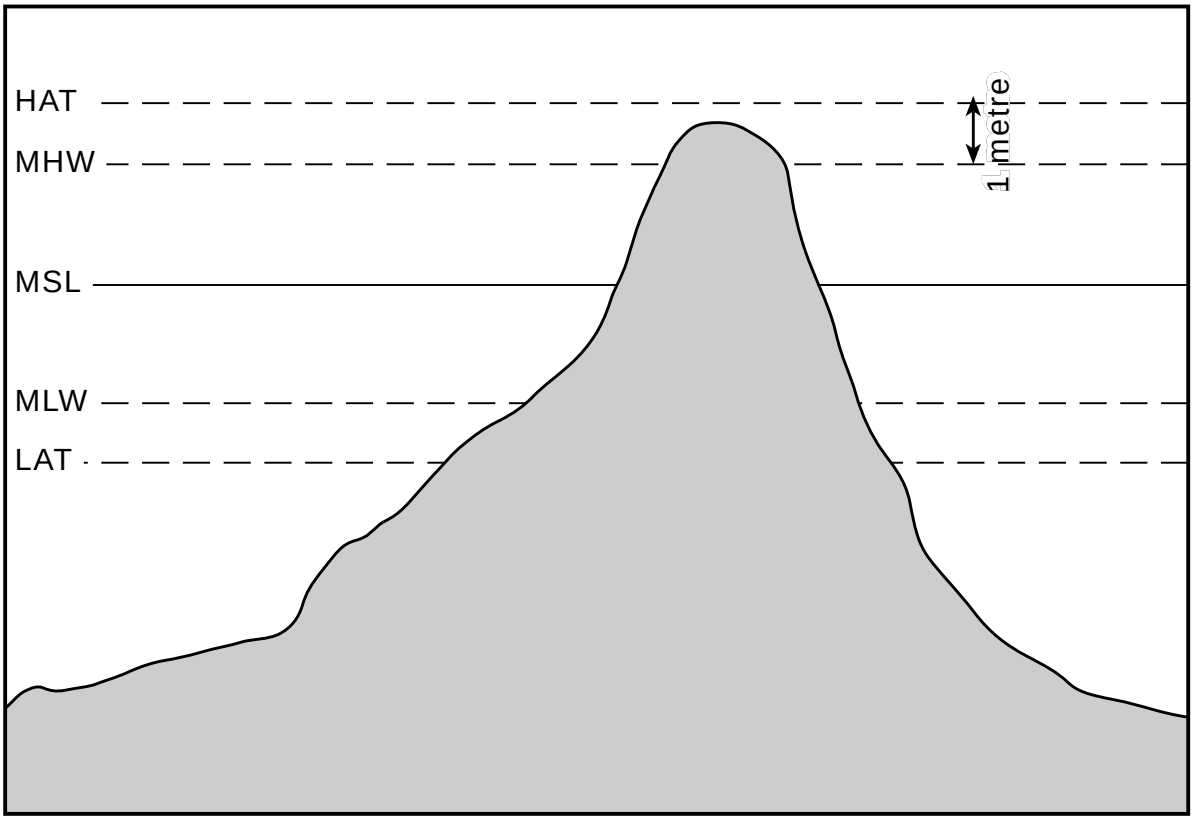
A key element in the interpretation of Article 5 of UNCLOS is determining what constitutes the "*low-water line.*" What is the meaning of this term? The level of the low-water line is dependent on the vertical datum used.[12] The vertical datum can be defined as a level of reference for vertical measurements such as depths, height of tide and elevations.[13] The tidal datum is a subset of the term vertical datum in that it refers to a level of reference for the measurement of tides.[14] Clearly, the lower the low-water line selected, the further seaward the normal baseline will lie. The area claimed from such a baseline will correspondingly increase, as will the area designated as internal waters landward of the baseline. However, unless there is a significant tidal range or the coastline in question shelves particularly gently, the impact of applying a lower tidal datum on the extent of the maritime zones claimed from that baseline will be minimal.[15]

The choice of vertical tidal datum will also determine which features near to the low-tide level will emerge above low-tide and therefore qualify as low-tide elevations. Equally, the same choice will determine which formations close to the high-tide level qualify as islands rather than as low-tide elevations. This is significant because if a feature does indeed qualify as a low-tide elevation or island, that feature may, under certain circumstances, be used as the basis for generating maritime zones (see Figure 10).

Unfortunately, neither the 1958 nor the 1982 Conventions specify the vertical datum to be used for the depiction of the low-water line on charts used for the determination of the normal

12 International Hydrographic Organization, 1993: 67-70.
13 Antunes, 2001.
14 Antunes, 2000: 5.
15 Carleton, 1997. See also, Antunes (2000).

Figure 10: Insular Features and the Vertical Datum



baseline. As a result, a variety of datums have been used by states, providing a range of low-water lines and thus scope for dispute.

The potential for dispute related to choice of vertical datum is to some extent minimised by the fact that charts are primarily designed to aid the navigator and for safety reasons the vertical datum used for the depiction of underwater features, including the 'zero' line tends to err on the side of caution. Modern charts therefore frequently take the Lowest Astronomical Tide (LAT), as the low-water datum and this has been accepted as the preferred datum for navigational charts by the International Hydrographic Organization (IHO).[16] The definition of LAT is:

> *The lowest tide level which can be predicted to occur under average meteorological conditions and under any combination of astronomical conditions.*

However, numerous alternative datums exist including:

> **Mean Lower Low Water** (MLLW) defined as:
> The average height of the lower low waters at a place over a 19 year period.
>
> **Lower Low Water Large Tides** (LLWLT) defined as:
> The average of the lowest low waters, one from each of 19 years of prediction.

[16] Carleton, 1997.

Lowest Low Water Spring Tide (LLWST) defined as:
The average of the lowest low water observations of spring tides, over a specified period.

Mean Low Water Springs (MLWS) defined as:
The average height of the low waters of spring tides.

If any of these alternative chart datums are used on the largest scale charts recognised by the coastal State, under the terms of the UN Convention, they can be regarded as legitimate vertical datums for the purpose of deriving the normal baseline.

An example of the difficulties that can arise in a maritime boundary delimitation, that related to the choice of tidal datum, concerned a long-running dispute between Belgium and France, which was finally settled in 1990. France used the lowest astronomical tide as its chart datum for determining the low-water line. In contrast, Belgium used the mean low-water spring tides as the datum for the construction of its charts. In effect the French datum represented a low tidal level which is rarely reached while the Belgian datum was an average low-tide level measured over the internationally accepted tidal period of 18 and two-thirds years. The less conservative Belgian tidal datum was approximately 30 centimetres higher than that used by France.

The dispute between the two states rested on the suitability of a feature called the Banc Breedt, located 2.5nm off the French coast as a territorial sea basepoint. Under the French datum, Banc Breedt qualified as a low-tide elevation. Under the Belgian datum, however, the feature was permanently below the low-water level and was therefore unsuitable for use as a basepoint in constructing the territorial sea boundary between the two sides. The dispute was eventually resolved in 1990 by splitting the difference between two delimitation lines constructed, one using the Banc Breedt as a basepoint and one ignoring it (see Figure 11).[17]

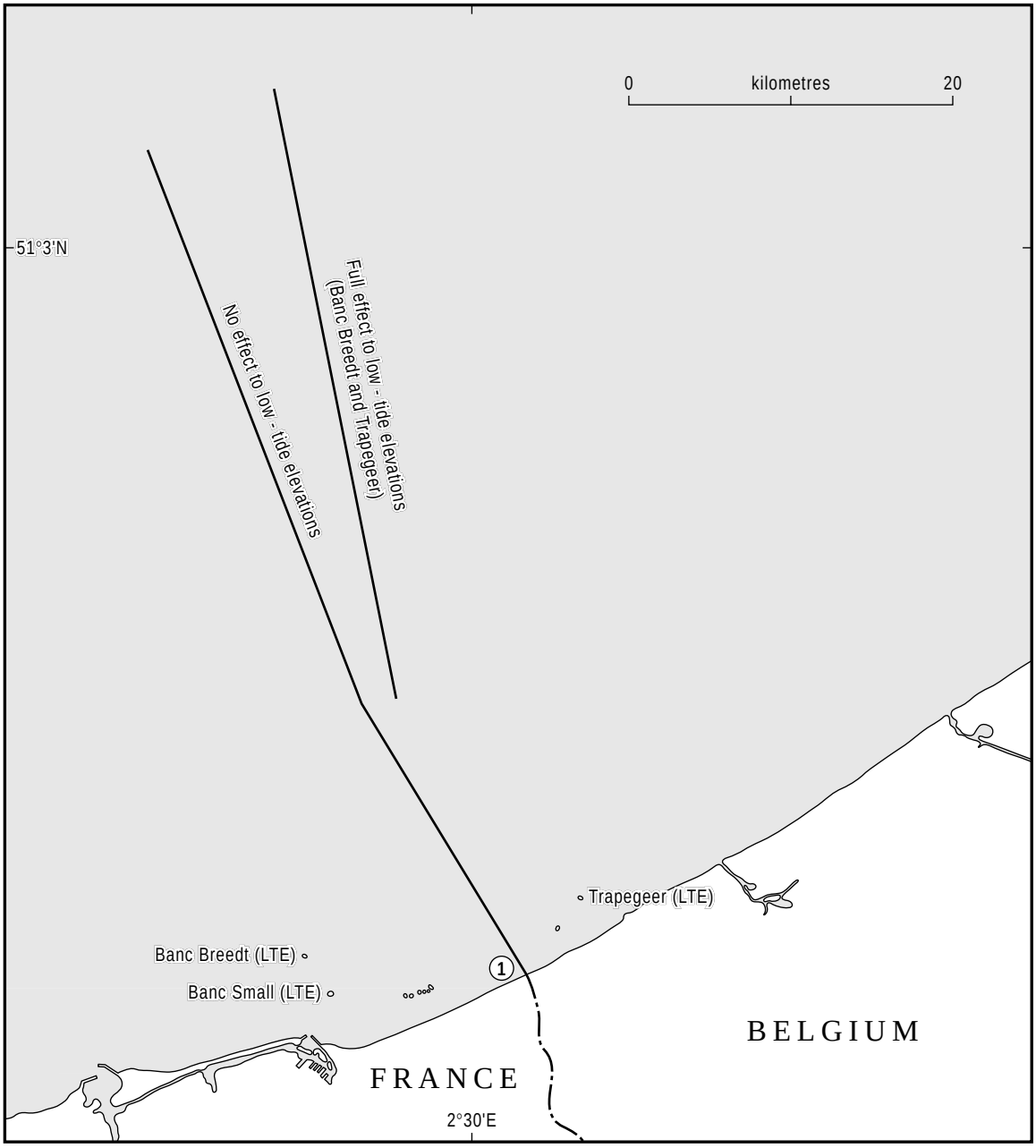
Where particular care should be exercised is if the vertical datum used changes from chart to chart. It is possible that in this situation a normal baseline feature, such as a low-tide elevation, may occur on one chart and not on another. Care should also be taken if land maps are used to help define a normal baseline. This can occur if the charts of a particular area are on too small a scale and the technical expert has to revert to the use of larger scale land mapping to define the baseline. Most land maps either use Mean Sea Level as the vertical datum to depict the position of the coastline, or in some cases of large scale mapping, will show a high water coastline and a low water coast line. However, the vertical datum used will seldom be the same as that used on nautical charts.

Low-tide elevations (LTEs) are also highly dependent upon the vertical datum used. LTEs as defined in Articles 11 of the 1958 Convention and 13 of UNCLOS, both of which are identical, may be used as territorial sea basepoints, provided they lie within the breadth of the territorial sea, measured from the low-water line of the mainland or an island (see Figure 12).

LTEs are low features, which are depicted as drying by a few decimetres on the large scale charts used for the definition of the baseline. If the vertical datum used is other than LAT, these features may not 'dry' at low-water and would therefore not count as LTEs. Additionally many LTEs are sand banks which can form and erode quite quickly. Other parts of a state's coastline may also be

[17] Charney and Alexander, 1993: 1,891-1,900.

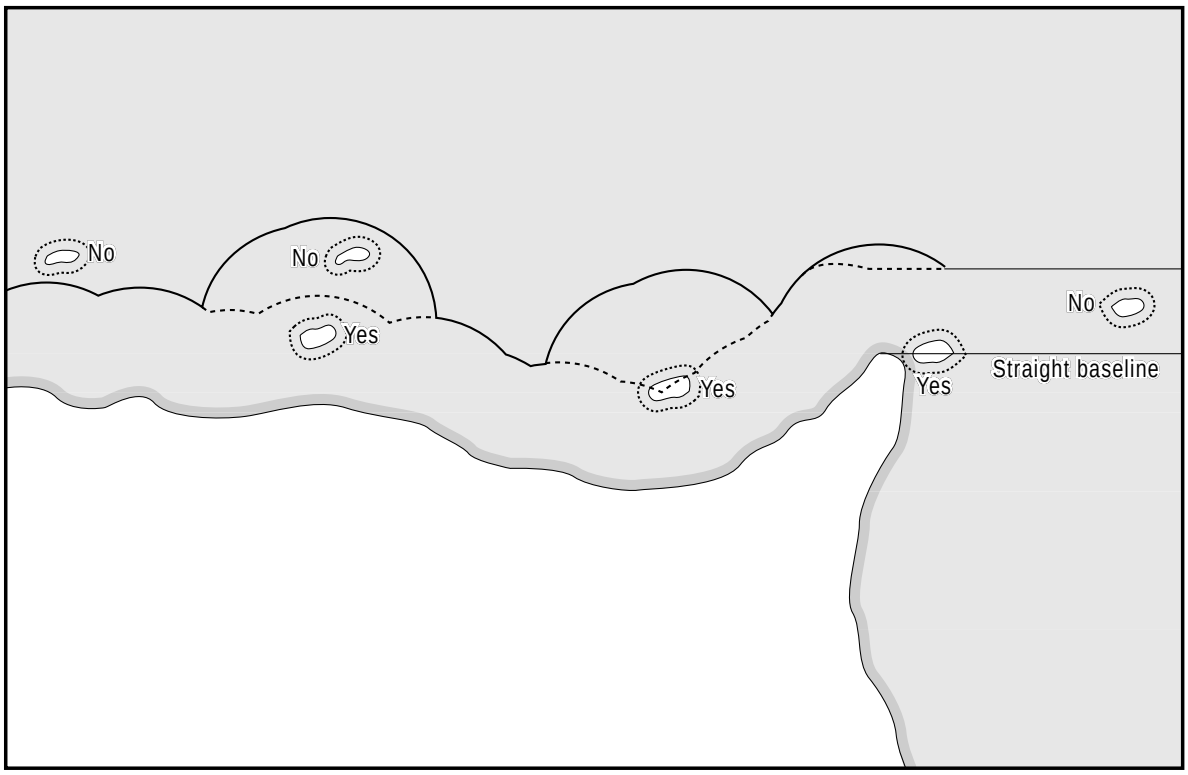
Figure 11: The Impact of Low-Tide Elevations on Delimitation between Belgium and France



subject to rapid erosion or accretion, thus shifting the position of the low-water line/normal baseline. This process is part of the natural ambulatory nature of a normal baseline and coastal states should be aware of the need to maintain up-to-date information on the position of the baseline in areas where it tends to be unstable.

It is, however, worth recognising that Article 5 refers to the low-water line along the coast *"as marked on large-scale charts officially recognised by the coastal state."* It is therefore the chart that is the legal document determining the position of the normal baseline and this remains the case even where the coastline has, in reality, changed. Thus, if the coastline has altered, but it has not been published, the legal baseline is still that on the published chart. Where this is the case, the normal baseline will only come to reflect the physical change in the

Figure 12: Low-Tide Elevations and Maritime Claims



coastline if a fresh survey is undertaken and the chart correspondingly updated. In areas where the coastline is highly unstable, specifically where deltas exist, Article 7 permits the use of straight baselines (see Section 3.3).

3.2 Reefs

According to Article 6 of the UN Convention:

> *In the case of islands situated on atolls or of islands having fringing reefs, the baseline for measuring the breadth of the territorial sea is the seaward low-water line of the reef, as shown by the appropriate symbol on charts officially recognized by the coastal state.*

The key terms here are *"atoll"* and *"fringing reef"*, both of which have strict geomorphological definitions.[18] However, as Prescott points out, Article 6 makes no distinction between the various types of atoll (oceanic, shelf or compound) or fringing reef recognised by geomorphologists and *"there is no evidence that those who drafted the*

[18] The UN study on baselines notes that geomorphologists reserve the term *"atoll"* for reefs which surround a lagoon and are surmounted by one or more islands; such reefs being generally pierced by channels and the lagoon waters having an average depth of 45 metres. The UN report goes on to acknowledge that such atolls are also categorised according to their location, with oceanic and shelf atolls being distinguished (United Nations, 1989: 5). Similarly, the term *"fringing reef"* has a strict scientific meaning, the most significant element of which is the fact that fringing reefs are the result of biological processes and are therefore distinct in character from rock platforms (*Ibid.*: 8).

Convention took such a restricted view."[19] Furthermore, the UN study on baselines states categorically that Article 6 *"is not confined to atolls in the strict scientific sense."*[20]

It is therefore reasonable to conclude that Article 6 also applies to 'almost atolls', that is, features which have a similar configuration and appearance to atolls but fall outside the precise scientific definition.[21] Similarly, Article 6's mention of fringing reefs might be stretched to apply to barrier reefs at some distance from the coastal low-water line.[22]

One further noteworthy point relating to reefs and UNCLOS is that there appears to be no specific provision allowing straight baselines to be drawn across the channels which penetrate a reef system and connect lagoon waters to the open sea. This appears to be something of an oversight, as it should not be a difficult task to make the case that lagoon waters are sufficiently closely linked to the land domain to be considered subject to the regime of internal waters as provided for by Article 7(3) dealing with straight baselines (see Section 3.3). Similarly, it could be argued that lagoons, whose waters are land-locked save for narrow channels to the open sea, could be viewed as being comparable to a bay with multiple mouths and it is highly likely that the lagoon waters would fulfil the semi-circle test set out for bays by Article 10 (see Section 3.5).[23]

Furthermore, the right to close such channels with straight baselines and claim lagoon waters as internal waters is implied by Article 47 dealing with archipelagos, paragraph 7 of which provides that lagoon waters may be counted as land when land:water ratios are calculated.

3.3 Straight Baselines

Where particular, restricted, geographical circumstances exist, international law allows states to depart from the application of normal baselines and measure maritime jurisdictional zones from straight baselines drawn along selected parts of their coastlines. At the time of writing 73 coastal states and dependent territories employed straight baseline systems along all or part of their coasts.[24]

The provisions defining the usage of straight baselines are laid down in Article 4 of the 1958 Geneva Convention on the Territorial Sea and Contiguous Zone which were later largely repeated in Article 7 of UNCLOS. Article 7 does, however, also provide guidance in relation to baselines on highly unstable coastlines and allows for the possibility of using low-tide elevations without lighthouses as basepoints in a straight baseline system so long as such lines have acquired general international recognition – provisions absent from Article 4.

Article 7 of the UN Convention provides that:

19 Prescott, 1985: 48.
20 United Nations, 1989: 6. See also, Beazley (1991 and 1994).
21 United Nations, 1989: 6.
22 *Ibid.*: 8.
23 *Ibid.*: 11-12; Prescott, 1985: 49.
24 UK Hydrographic Office records, August 2001.

1. *In localities where the coastline is deeply indented and cut into, or if there is a fringe of islands along the coast in its immediate vicinity, the method of straight baselines joining appropriate points may be employed in drawing the baseline from which the breadth of the territorial sea is measured.*

2. *Where because of the presence of a delta and other natural conditions the coastline is highly unstable, the appropriate points may be selected along the furthest seaward extent of the low water line and notwithstanding subsequent regression of the low-water line, the straight baselines shall remain effective until changed by the coastal State in accordance with this Convention.*

3. *The drawing of straight baselines must not depart to any appreciable extent from the general direction of the coast, and the sea areas lying within the lines must be sufficiently closely linked to the land to be subject to the regime of internal waters.*

4. *Straight baselines shall not be drawn to and from low-tide elevations, unless lighthouses or similar installations which are permanently above sea level have been built on them or except in instances where the drawing of baselines to and from such elevations has received general international recognition.*

5. *Where the method of straight baselines is applicable under paragraph 1, account may be taken, in determining particular baselines, of economic interests peculiar to the region concerned, the reality and importance of which are clearly evidenced by long usage.*

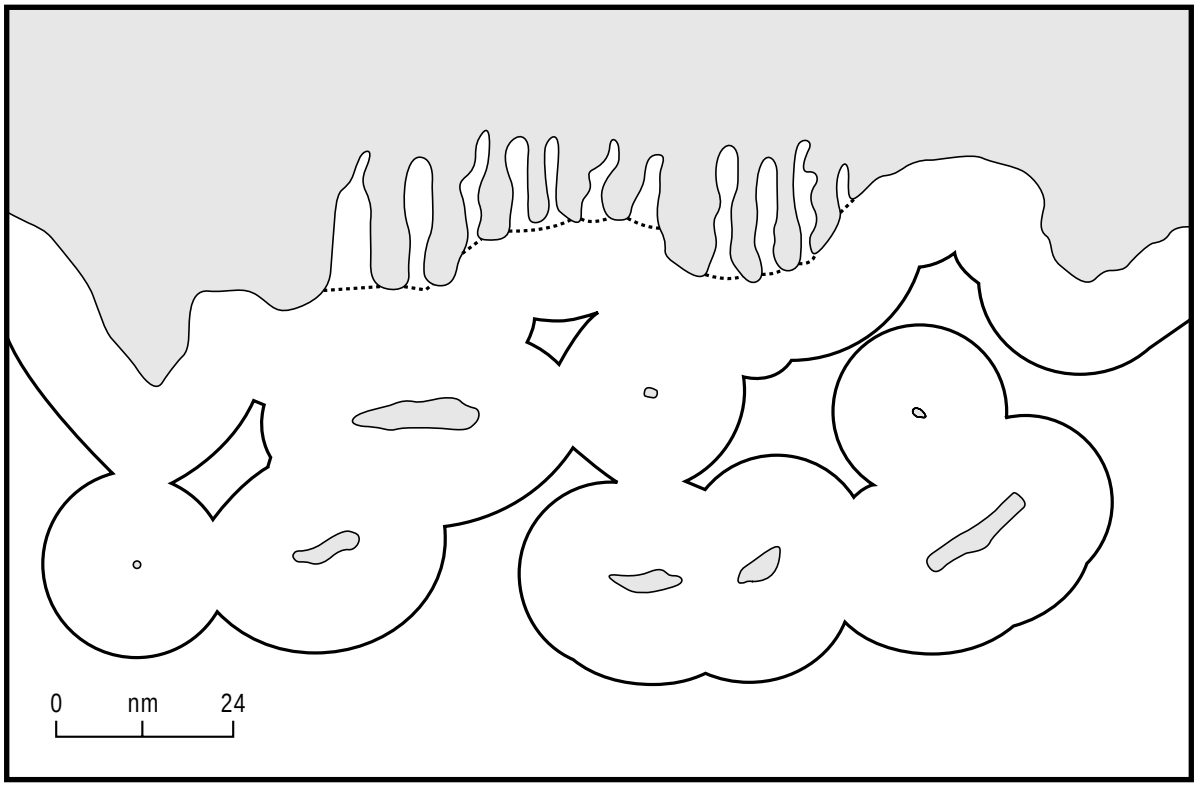
6. *The system of straight baselines may not be applied by a State in such a manner as to cut off the territorial sea of another State from the high seas or an exclusive economic zone.*

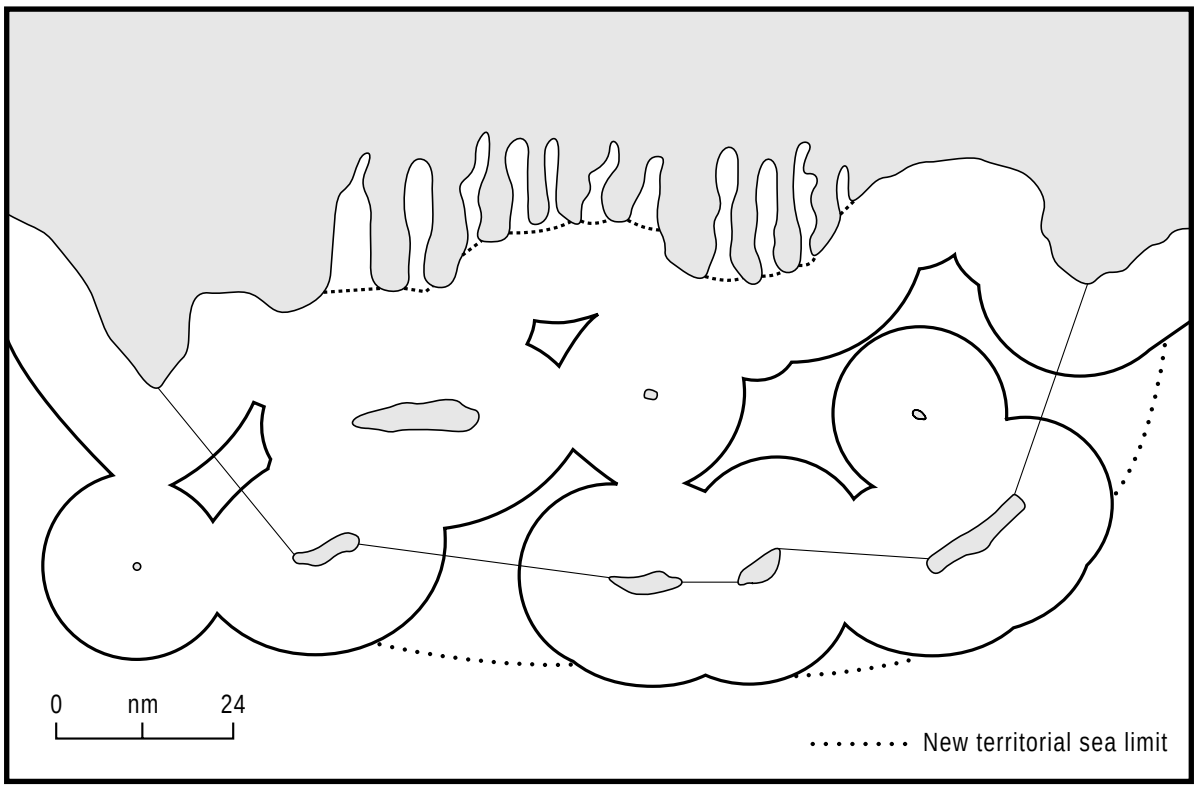
The intention of Article 7 and its predecessor, Article 4, of the Geneva Convention is to cater for unusual coastal geography whereby the configuration of the coastline is such that simply using normal baselines and bay closing lines would result in enclaves or pockets of non-territorial sea surrounded by the territorial sea of a particular state. Such a scenario, involving a complex patchwork of territorial and non-territorial sea areas would inevitably raise problems in terms of marine management (see Figure 13).

The provisions set out in Article 7 of UNCLOS give rise to several significant queries, as precise definitions for the terms allowing the establishment of straight baselines are not provided. Consideration of some of these questions will help to explain why these provisions have been so widely interpreted in state practice during the last 30 years. For example:

- What constitutes a *"deeply indented and cut into"* coastline?
- How is a *"fringe"* of islands defined and at what distance offshore is such a fringe of islands in the coastline's *"immediate vicinity"*?
- What is meant by the term *"highly unstable"*?
- By what means is the *"general direction"* of the coastline and what angle represents divergence to an *"appreciable extent"* from that direction?

Figure 13: The Role of Straight Baselines in Simplifying Territorial Sea Baselines





A further difficulty within the article arises by the lack of any limit to the length of a straight baseline segment. This has enabled states to draw excessively long segments in some cases. There are many examples over 100nm in length around the world particularly in the Far East.

Article 7 similarly fails to provide any rule for ascertaining whether the sea area enclosed by a particular straight baseline system is *"sufficiently closely linked to the land to be considered subject to the regime of internal waters."* In addition, there is no definition as to how the *"economic interests peculiar to the region"* are to be quantified and no test is provided whereby states may prove their *"long-usage"* of areas so enclosed.

As a consequence of this lack of precision in definition, and thus the absence of any means to test the validity of a particular straight baseline system, the adoption and application of straight baseline systems has been open to wide interpretation in state practice.[25] Unsurprisingly, states have sought to interpret Article 7 to their maximum advantage, resulting in the establishment of what might be termed liberal or even aggressive straight baseline systems often reaching significantly offshore in order to secure the maximum advantage in any maritime delimitation with neighbouring states.[26]. As Prescott notes: *"the imprecise language* [of Article 7] *would allow any coastal country, anywhere in the world, to draw straight baselines along its coast."*[27]

Several authorities have attempted detailed analysis of international law as it relates to straight baselines with the aim of shedding some light on the question of how international law should be interpreted and applied.

An early analysis of note was that of Hodgson and Alexander who examined the Norwegian straight baseline system which had earlier been subject to dispute before the ICJ and whose validity had been upheld by that body (see Figure 14).[28] This 1951 ICJ decision may be considered fundamental to the introduction of the straight baselines concept into international law, leading directly to the drafting of Article 4 of the Geneva Convention and Article 7 of the UN Convention respectively. Hodgson and Alexander found that in the case of the Norwegian straight baselines:

- only two or three lines varied more than 15° from a general direction as judged from small scale charts;
- the distinguishing features – fringing islands or deep indentations – extend along between 60% and 70% of the coastal stretch concerned;
- the ratio of water to land enclosed between the baselines and the mainland coast is 3½:1;
- the longest single stretch of baseline is 45 sea miles.[29]

Turning to analyses of the articles related to straight baselines in UNCLOS, perhaps the most influential is a 1987 US Department of State study which goes so far as to offer guidelines which seek to address some of these questions.[30] The report concentrates on the key baseline concepts of defining deep coastal indentations and the use of fringing islands. The aim of the

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25 Francalanci (1998: 112) noted that *"A mathematical formula which can be applied to all geographical cases does not exist; it would need to contain so many variable parameters that it becomes an impracticable enigma.*

26 Roach and Smith, 1994; Scovazzi *et al.*, 1989. Reisman and Westerman (1992: xv) refer to an *"explosion"* of unilateral straight baseline claims post-1951, many of which they view as *"manifestly inconsistent with formal legal requirements"* resulting in *"chaos"* in this area of the law of the sea.

27 Prescott, 1985: 64 and 1987.

28 Hodgson and Alexander, 1972: 23-44.

29 Summarised in Kapoor and Kerr, 1986: 36.

30 US Department of State, 1987.

Figure 14: Norway's Straight Baselines

US study was to suggest standard guidelines in order to allow a *"reasoned evaluation"* of straight baseline systems claimed around the world making it possible to identify *"with a certain degree of confidence"* those straight baseline systems conforming to international law and those which do not.[31]

31 US Department of State, 1987: 2.

It must be emphasised, however, that these US suggestions are by no means universally accepted – as demonstrated by recent state practice. Indeed, as the preamble to the study itself states, the guidelines suggested *"do not have international standing as benchmarks against which all such systems should be measured"*, and are not offered as *"unequivocal yardsticks of the legality of straight baseline systems."*[32] Nevertheless, many commentators regard the US rules as a useful benchmark even if they have proved to be too strict for many coastal states.

In addition, the United Nations has itself issued a 1989 report in its Law of the Sea series entitled *Baselines: An Examination of the Relevant Provisions of the United Nations Convention on the Law of the Sea* which also attempts to tackle the thorny problem of interpreting the provisions contained in Article 7 of the UN Convention.[33]

These two key studies deserve particular attention and are therefore referred to extensively in the course of the following analysis which is designed to illustrate the difficulties of interpretation that can arise.[34]

Deeply Indented Coasts

With respect to coastlines that qualify as *"deeply indented"* the Department of State identified the following criteria to test a given coastline's suitability:[35]

- Within the particular locality being considered, baseline segments accounting for at least 70% of the total length of the relevant baselines should each have at least 6:10 ratio of coastal penetration to segment length;
- A coastline must have at least three significant indentations in any given locality;
- No individual straight baseline segment should exceed 48 nautical miles in length.

The United Nations' study emphasises the need to *"focus on the spirit as well as the letter"* of the first paragraph of Article 7, the aim of which is to avoid the undesirable mosaic of territorial and non-territorial sea areas which would result from the application of the normal baseline in certain geographically complex coastal situations.[36]

Although the report observes that no objective test by which to identify deeply indented coasts has been developed and gained general acceptance, it concludes that it has been generally accepted that there must be several indentations involved, which individually would satisfy Article 10's requirements, to be considered a juridical bay.

In the United Nations' view, the spirit of Article 7 is preserved if straight baselines are drawn so that a complex pattern of territorial seas produced by the use of the normal baseline can be eliminated by the use of straight baselines *"without significantly pushing the seaward limits of the territorial seas away from the coast"* as *"it is not the purpose of straight baselines to increase the territorial sea unduly."*[37]

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32 *Ibid.*: 2.
33 United Nations, 1989.
34 For a strict interpretation of the straight baseline regime see Reisman and Westerman (1992: 71-104).
35 US Department of State, 1987: 5.
36 United Nations, 1989: 17; Prescott, 1985: 50.
37 United Nations, 1989: 17 and 20.

Figure 15: Former Yugoslavia's Straight Baselines

Fringe of Islands

Straight baseline turning points may be situated on islands in the broadest meaning of the word, including rocks that remain above water at high tide. However they may not be situated on low-tide elevations unless a lighthouse or similar feature is situated on the LTE and remains above water at high tide. However these features have to "*fringe*" the coast and be in its "*immediate vicinity.*" Concerning baseline systems in cases where there is a "*fringe of islands along the coast in its immediate vicinity*" the US guidelines advanced the following criteria to identify qualifying coasts:[38]

- In light of the provision that "*the drawing of straight baselines must not depart to any appreciable extent from the general direction of the coast*", the directional trend of the outer islands (i.e., the islands on which the straight baseline turning points will be situated) should not deviate more than 20º from the opposite mainland coastline;

38 US Department of State, 1987: 17-18.

- There must be a consideration of distance between the outermost islands and the mainland coastline;
- Islands considered part of the fringe should not be further apart from each other than 24 nautical miles;
- Such islands should mask 50% of the opposite mainland coastline;
- No individual straight baseline segment should exceed 48 nautical miles in length;
- Such islands should be no more than 48 nautical miles offshore.[39]

Although this may be considered too rigid in all cases, this figure should be borne in mind when contemplating the construction of a straight baseline system.

Once again the United Nations' (UN) study makes it plain that there exists *"no uniformly identifiable objective test which will identify for everyone islands which constitute a fringe in the immediate vicinity of the coast."*[40] Instead states are recommended to follow the *"spirit"* of Article 7.

The only firm guidelines the UN study offers are the observations that the term *"fringe of islands"* suggests that there must be more than one island involved (while noting that it is *"difficult to specify a minimum number"*) and that the requirement that the fringe be *"along the coast"* would mean that a chain of islands aligned perpendicularly to the coast would not qualify.[41]

Instead of objective rules and tests, the UN's report offers two scenarios, backed by examples, where a fringe of islands is likely to exist.[42] Firstly, where islands *"appear to form a unity with the mainland"* as in the case of Norway's *skjaergaard* (Figure 14); and secondly where islands at some distance from the coast *"form a screen which masks a large proportion of the coast from the sea."* In the latter case the islands along Yugoslavia's (now Croatia's) coastline from Pula to Sibenik are cited as typifying this sort of fringe (Figure 15).

As emphasised by the UN study, the classic case of a fringe of islands is that of Norway. This fringe of islands is so dense that the mainland coast is completely obscured when viewed from offshore. The islands are close inshore and definitely meet the requirements of UNCLOS Article 7, paragraph 1. Figure 14 illustrates this point. A not so perfect fringe, but nevertheless perfectly acceptable is illustrated in Figure 16 showing the straight baseline system off the west coast of Scotland.

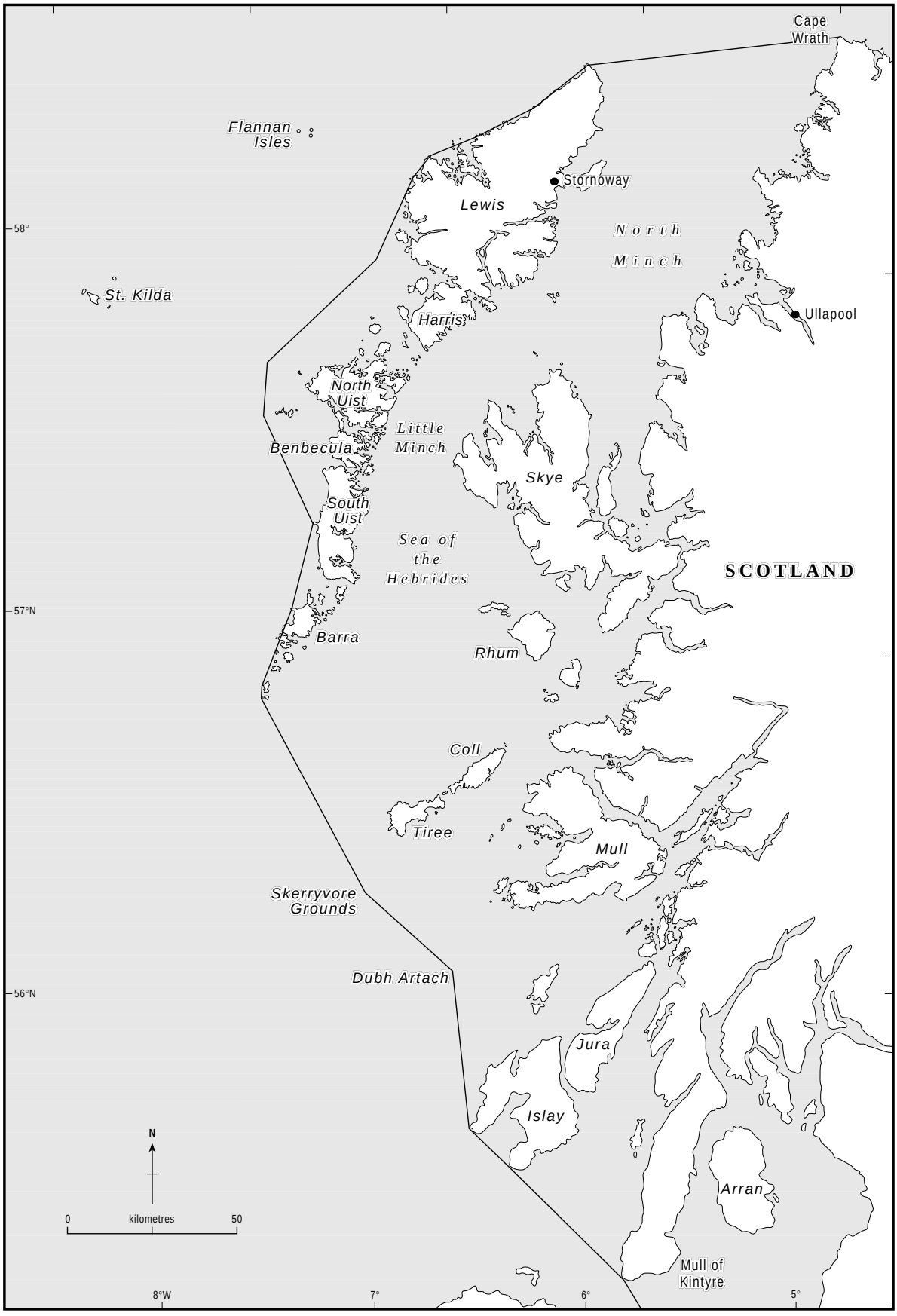
Compare this figure with the People's Republic of China's claimed straight baseline system, Figure 17. Here many of the offshore islands are widely separated and well off the mainland coast, up to 70nm in one case. Parts of the coast are legitimately fringed with islands, but these are all much closer to the mainland coast.

Immediate Vicinity

While the intent of the phrase in the coast's *"immediate vicinity"* is clear enough, Article 7 once again fails to deliver a clear-cut, objective test by which to judge whether certain islands are close enough to a mainland in order to be considered in its immediate vicinity. The US

39 *Ibid.*: 22.
40 United Nations, 1989: 20.
41 *Ibid.*: 20.
42 *Ibid.*: 20.

Figure 16: Straight Baselines off the West Coast of Scotland



study cites Prescott[43] as noting that while there was probably a general consensus that a fringe of islands 3nm from the coast was within the coast's immediate vicinity whereas one 100nm from the coast would not be, *"Unfortunately, it would not be possible to predict with confidence what the majority thought of a fringe of islands 25, 40 or 65 nautical miles from the coast."*[44]

For its part the US study suggested that there was likely to be general agreement that if the area between the islands and mainland would fall within a state's territorial sea measured from normal baselines, then it would be difficult to argue that those islands were excessively far offshore not to be termed in the mainland coast's immediate vicinity. With 12nm breadth territorial seas this gives a limit of 24nm between the mainland and the island fringe.

This 24nm distance was proposed as a minimum limit. A maximum limit of a 48nm separation between islands and mainland was also suggested, the logic being that no more than twice the area of hypothetical territorial seas drawn from the normal baselines of the islands and mainland would be enclosed by the straight baselines system and thus converted into internal waters. Despite providing this maximum limit, the US study did envisage circumstances where the 48nm rule might prove too restrictive, for example where: *"an island grouping consisting of a number of islands that are not far separated from each other but that, nevertheless, work their way considerably seaward of the mainland coast."* In such a case, the report went on, *"if other criteria were met, straight baselines in these areas would not be precluded by this rule."*[45]

That the US guidelines themselves contain such loopholes illustrates the problems of attempting to establish hard and fast rules which remain universally applicable in the face of the complexity and diversity of coastal geography.

The UN study concurred with the argument that a 24nm separation between island fringe and mainland is probably generally agreed upon but observed that the 48nm limit *"is not necessarily widely agreed upon."*[46] Indeed, it is understood that the US itself has retreated from its own 48nm rule proposal to the more conservative and restrictive 24nm rule. [47]

Maximum Segment Length

The US guidelines accept that this is one of the more controversial guidelines discussed.[48] The guidelines state that *"no baseline segment should exceed 48 nautical miles in length."*[49] The argument for the rational for this length stems from the restriction imposed on the length of bay closing lines of 24nm in both the 1958 Geneva Convention and UNCLOS. Thus the 48nm maximum is double that for a bay and *preserves the significance of the differences between the bay articles and the straight baseline articles of the two Conventions, without according coastal states unrestrained license in drawing baselines.*[50]

43 Prescott, 1985: 4.
44 US Department of State, 1987: 22.
45 *Ibid.*: 22.
46 United Nations, 1989: 21.
47 Personal correspondence with Dr R.W. Smith, Office of Ocean Affairs, US Department of State, July 1997.
48 US Department of State, 1987: 14.
49 *Ibid.*: 14.
50 *Ibid.*: 15.

The UN study does not address this difficult issue at all, perhaps indicating that even the UN appointed technical experts, who participated in the drafting of the UN study, could not agree on this matter. Since the US guidelines were published it is apparent that the US has reverted to the more restrictive 24nm maximum for straight baseline segments.[51] This is considered to be too restrictive and the previously suggested limit of 48nm is more realistic as a maximum that should be encouraged.

Deltas

In addition to outlining the key conditions which justify the application of straight baselines (deep indentations and/or fringe of islands), Article 7 also provides rules relevant to a specific coastal circumstance – deltas.

Although the US study of 1987 is silent on the question of straight baselines and deltas as dealt with by Article 7(2), the UN report does highlight three key points.

The second paragraph of the article is subordinate to the first rather than being an alternative to it. Thus the requirements of paragraph 1 of Article 7 – that the coastline in question be deeply indented and cut into, or there be a fringe of islands along that coast in its immediate vicinity – must first be met before Article 7(2) may be applied.

Article 7(2) refers to *"a delta and other natural conditions"* [emphasis added] so that for this paragraph of the Article to apply, a delta must exist. Additionally, the coastline concerned must be "*highly unstable.*" No precise definition is provided within the UN Convention for the latter term.

Article 7(2) was introduced into the UN Convention with a specific case in mind – the delta of the Ganges/Brahmaputra Rivers – where environmental conditions can lead to rapid erosion and sedimentation resulting in significant advance and retreat of the low-water line. The provisions outlined here allow states faced with such a situation to establish straight baselines without the obligation of continuously altering them with each change in the normal baseline.

Location of basepoints and use of low-tide elevations

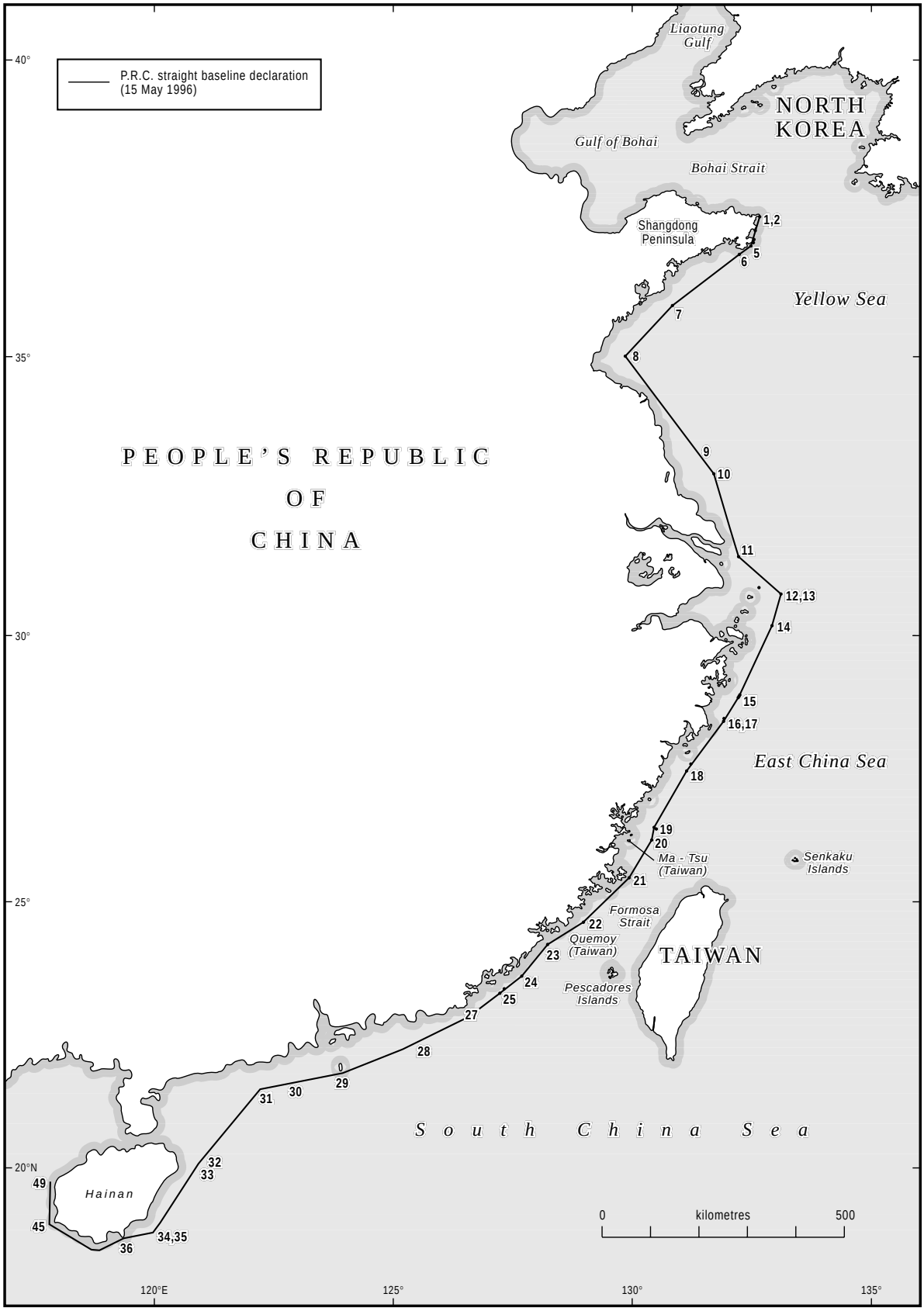
Article 7 further provides that straight baselines should join "*appropriate points.*" The UN study makes it explicit that there are requirements that such appropriate points should be on or above the charted low-water line, on the territory of the state establishing the straight baselines and that the straight baseline system as a whole be closed (that is, it should start and finish on or above the low-water line).

Paragraph 4 of Article 7 specifies that low-tide elevations are not to be used in the drawing of straight baselines unless one of two conditions is met. Firstly, if the low-tide elevation concerned is surmounted by a lighthouse or similar structure, or, alternatively, if the use of the low-tide elevation as a basepoint for constructing straight baselines has received general international recognition.

The first condition is fairly clear-cut, as low-tide elevations are specifically defined in Article 13 of the UN Convention and it is generally clear whether a lighthouse or similar installation does indeed exist on it or not. The second condition is somewhat more problematic because, at least to some extent, it may be a matter of interpretation as to the degree of international

[51] Roach and Smith, 1996: 64.

Figure 17: The People's Republic of China's Straight Baselines



recognition that exists in relation to the use of a particular low-tide elevation as a basepoint in a straight baseline system.

The latter provision, absent from Article 4 of the Geneva Convention, was included in the 1982 Convention in order to take into account Norway's straight baseline system. Norway's straight baselines employ low-tide elevations lacking any structures, lighthouse or not, as basepoints and this system of straight baselines was expressly approved by the International Court of Justice in 1951. Technically, therefore, despite the ICJ's ruling, the Norwegian straight baselines contravened the terms of Article 4 of the Geneva Convention. Article 7 of the UN Convention was therefore designed to accommodate the Norwegian system and resolve this apparent conflict between the Geneva Convention and the judgement of the ICJ.[52]

The Norwegian straight baseline system has long been recognised and accepted by the international community (see Figure 14), but if a coastal State uses a LTE in a new system, without the required navigational structure, this would be considered illegal.

The People's Republic of China have used two such turning points in their system, (Figure 17) which are not only devoid of a navigational structure, but also lie outside the breadth of the territorial sea, measured from the mainland coast. This type of abuse of the internationally recognised rules should not be tolerated, and indeed several coastal states have lodged diplomatic protests with the PRC regarding this system.

Egypt has also employed illegal basepoints in its straight baseline system declared under Decree No. 27, dated 9 January 1990. Apart from the fact that the Egyptian coast is neither deeply indented, nor fringed with islands, several of the straight baseline turning points off the Mediterranean coast are situated on charted shoals that do not dry at chart datum. Figure 18 illustrates this system in the Mediterranean.

General Direction

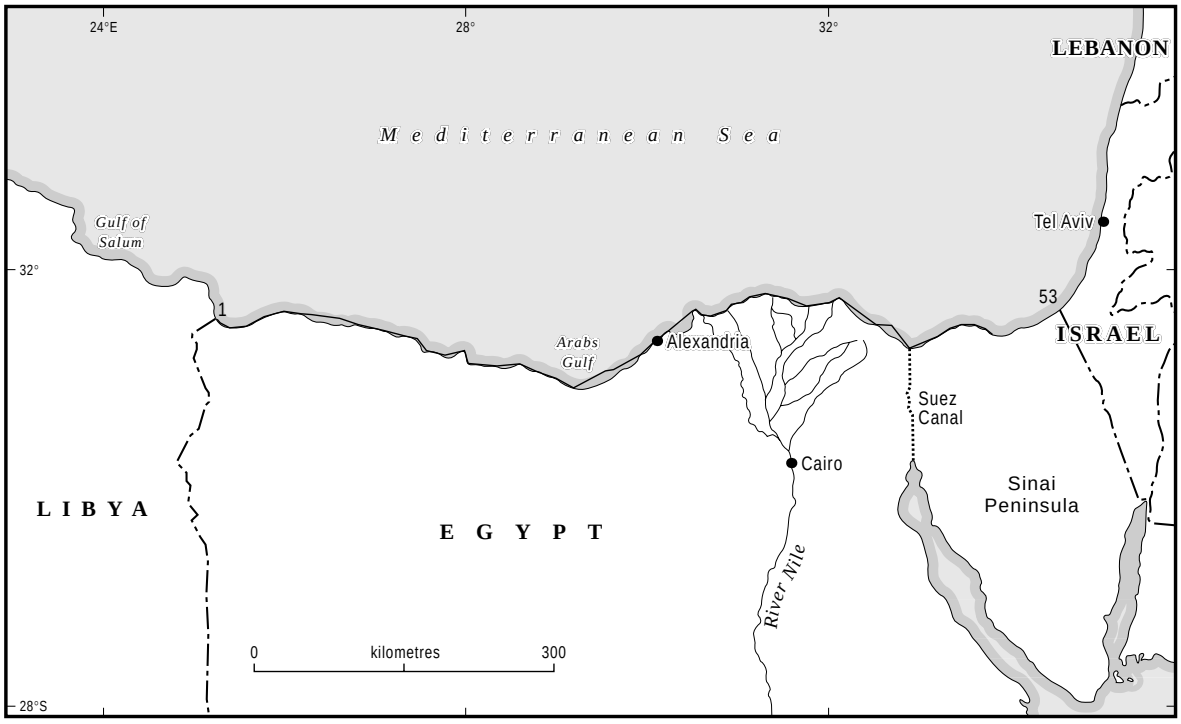
Article 7, paragraph 3 specifies that the alignment of straight baselines *"must not depart to any appreciable extent from the general direction of the coast"*, a concept which stemmed from the 1951 Anglo-Norwegian Fisheries case judgement. As noted earlier, it was found that in the case of the Norwegian straight baselines that almost all the straight baseline segments diverged from what the Court determined as the general direction of the coast by no more than about 15°.

Subsequently, the US guidelines on this issue proposed an upper limit of divergence from the general direction of the coast of no more than 20°. This suggested limit was qualified by the proviso that in cases where the fringe of islands concerned is generally parallel to the coast, the lines joining that fringe to the mainland coast may exceed the 20° rule.[53]

Although the technical expert might have considerable sympathy with these suggestions, state practice has dictated that these figures are too constraining. Nonetheless they are a useful bench mark, when making decisions on the design of a straight baseline system. Unfortunately in reality, if a coastal state considers it can get away with declaring an excessive straight baseline system, it will probably go ahead.

52 United Nations, 1989: 24.
53 US Department of State, 1987: 21.

Figure 18: Egypt's Straight Baselines in the Mediterranean



Nevertheless, it is worth recalling that in the Anglo-Norwegian Fisheries case the International Court of Justice found the entire concept of general direction to be "*devoid of mathematical precision.*"[54] As the UN report observes, it has, therefore, not only been impossible to determine a generally accepted precise angle of deviation from the general direction of the coast against which to test this rule, but the fundamental problem of determining what constitutes general direction in the first place has defied resolution.

Internal Waters

A further concept introduced into the UN Convention with the Anglo-Norwegian Fisheries Case in mind is the requirement that the sea areas enclosed by straight baselines "*must be sufficiently closely linked to the land domain to be subject to the régime of internal waters*" (Article 7(3)). Although the spirit of this provision is clear, and in the 1951 case this idea was linked to rules relating to the determination of bays, no mathematical test by which to accurately assess this provision has emerged. For its part the UN report opts to quote from the Swedish government's submission to the International Law Commission on this issue that:

> *...the expanse of water in question is so surrounded by land, including islands along the coast, that it seems natural to treat it as part of the land domain.*[55]

Economic Interests, Long Usage and Cut Off

Paragraph 5 of Article 7 provides the possibility of "*economic interests peculiar to the region concerned, the reality and importance of which are clearly evidenced by long usage*" having an influence on the determination of particular baselines. It has been observed that such economic interests do not themselves justify the establishment of straight baselines in the absence of deep indentations and/or a fringe of islands. Rather, these factors may provide

54 Kapoor and Kerr, 1986: 36.
55 United Nations, 1989: 25.

justification for an altered alignment of a segment or segments of a straight baseline system, not reason for the establishment of that system itself.[56]

The UN Convention gives no guidance as to what constitute valid economic interests, how to assess their *"reality and importance"* and what timespan amounts to *"long usage."* Neither the US study or the UN report offer real guidelines on this topic. The use of such subjective terms as *"importance"* and the open-ended nature of what might be termed *"economic interests"* and *"long usage"* effectively negates the possibility of applying mathematical formulae by which to test these rules and provides significant scope for flexibility in its application and thus dispute.

The final paragraph of Article 7 requires that a state's straight baselines should not be aligned in such a manner as to *"cut off the territorial sea of another State from the high seas or an exclusive economic zone."* This provision is unambiguous and therefore should not pose particular difficulties in its application.[57]

Summary
It is often difficult to establish whether particular baselines or basepoints have played a substantive role in determining the final location of a maritime boundary. States are free to establish any boundary alignment so long as agreement is reached and third-party rights are not infringed. Details of the methodology used in arriving at a particular line are seldom included in maritime boundary agreements. It is unlikely, therefore, that the text of an agreement will provide a detailed rationale for that boundary and particularly which basepoints or baselines were significant. Thus, frequently, a degree of uncertainty remains in the analysis of the delimitation of maritime boundariesand baselines.

Nevertheless, straight baseline systems themselves may be assessed against the international standard provided by Article 7 of UNCLOS and by suggested rules for the analysis of straight baselines, such as the US guidelines. For example, as previously mentioned, if the spirit of Article 7 is borne in mind and the US provisions were to be applied, it can be seen that Norway's system of straight baselines (see Figure 14) would pass the test. In contrast, the People's Republic of China's (see Figure 17) would not.

It should be stressed that the US guidelines, or indeed the UN baselines report, are no more than that, with no legal standing either as accepted international rules or in terms of state practice. However, they do provide a useful yardstick by which to assess straight baseline systems.

Overall, it is abundantly clear that the imprecision inherent in the terminology of the 1982 Convention has provided ample scope for liberal interpretation and extravagant baseline claims thus giving rise to numerous potential disputes between states. Having made that ominous comment, the way in which the UN Convention came to be concluded should be recalled. In a 'package deal' negotiation between numerous factions of competing state interests, compromise in its terms and thus scope for differing interpretations of them was perhaps inevitable. In these circumstances it is all the more remarkable that UNCLOS was drafted at all – had the issues outlined above been subject to even more intense analysis it seems doubtful that a Convention would have been concluded at all. Coupled with this

[56] *Ibid.*: 25.
[57] *Ibid.*: 25.

background to the negotiation process is the fact that the Convention's provisions had to be cast in such a way as to apply globally, despite the geographical complexity of the world. It is hardly surprising, therefore, that a degree of flexibility was retained within the Convention's terms.

3.4 River Mouths

Where a river *"flows directly into the sea"*, Article 9 of the UN Convention provides that *"the baseline shall be a straight line across the mouth of the river between points on the low-water line of its banks."* Significantly, the authentic French text of the first part of this Article of the Convention reads slightly differently from the authentic English text, instead saying, in translation, *"If a river flows into the sea without forming an estuary..."*[58] According to the UN Committee of Experts, the authentic English text should be interpreted in light of the meaning of the French text in this case.[59] That is, Article 9 only applies where no estuary is present. Estuaries themselves are to be dealt with in accordance with the provisions of Article 10 relating to Bays.

Further, it should be noted that Article 9 offers no restrictions on the length of the baseline closing a river mouth (both banks of which need not necessarily fall within the territory of one country). Article 9 has been left similarly flexible in relation to the choice of basepoints anchoring the baseline closing the river mouth. It is likely that this is the case because of the difficulties frequently associated with defining the precise mouth of a river.[60]

3.5 Bays

Article 10 of the UN Convention on the Law of the Sea, which is itself an almost verbatim repetition of Article 7 of the Geneva Convention on the Territorial Sea and Contiguous Zone of 1958, provides that:

1. *This article relates only to bays the coasts of which belong to a single State.*

2. *For the purposes of this Convention, a bay is a well-marked indentation whose penetration is in such proportion to the width of its mouth as to contain land-locked waters and constitute more than a mere curvature of the coast. An indentation shall not, however, be regarded as a bay unless its area is as large as, or larger than, that of the semi-circle whose diameter is a line drawn across the mouth of that indentation.*

3. *For the purpose of measurement, the area of an indentation is that lying between the low-water mark around the shore of the indentation and a line joining the low-water mark of its natural entrance points. Where, because of the presence of islands, an indentation has more than one mouth, the semi-circle shall be drawn on a line as long as the sum total of the lengths of the lines across the different mouths. Islands within an indentation shall be included as if they were part of the water area of the indentation.*

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58 *"si un fleuve se jette dans la mer sans former estuaire..."*

59 United Nations, 1989: 26.

60 Prescott, 1985: 51.

4. *If the distance between the low-water marks of the natural entrance points of a bay does not exceed 24 nautical miles, a closing line may be drawn between these two low-water marks, and the waters enclosed thereby shall be considered as internal waters.*

5. *Where the distance between the low-water marks of the natural entrance points of a bay exceeds 24 nautical miles, a straight baseline of 24 nautical miles shall be drawn within the bay in such a manner as to enclose the maximum area of water that is possible with a line of that length.*

6. *The foregoing provisions do not apply to so-called "historic" bays, or in any case where the system of straight baselines provided for in Article 7 is applied.*

Article 10 therefore offers both objective and subjective tests of bay status.[61] Paragraph 2's references to *"a well-marked indentation"*, and a bay being *"more than a mere curvature of the coast"* both indicate, as Prescott[62] notes that *"It is expected that the bay will be marked by a large change in the azimuth of the coast."* The concept of the bay's depth of penetration versus width of mouth being such that its area may constitute *"land-locked waters"* expresses the idea of a body of water surrounded on all but one side. These terms are, nonetheless, open to varied interpretation.

In order to overcome this problem a specific and unambiguous mathematical test was included in the Article, the semi-circle test. This formula is detailed in paragraph 3 of Article 10 where it is made explicit that the diameter of the semi-circle to be used to test the validity of a particular bay should be equivalent to the width of the mouth (or mouths) of the bay. Its conditions are illustrated in Figure 19. Prescott[63] also makes the observation that, strictly speaking, the semi-circle test should only be applied when it has been ascertained that a *"well-marked indentation"* exists. In reality, however, he suggests that it would be *"inconceivable"* for a state to object to the closing of a bay which satisfied the semi-circle test on the grounds of it not being a well-marked indentation.

Uncertainty remains, however, concerning how, in certain circumstances, the *"natural entrance points"* of a bay may be identified. As the UN Committee of Experts report indicates, certain bays may boast a number of points which could be considered its natural entrance(s) while others may possess smoothly curved entrances where it is difficult if not impossible to identify a single point as marking the entrance on one or both sides.[64] In this scenario there is no necessarily 'right' answer. It must therefore be concluded that a state may select any appropriate closing line for the bay as long as the terms of the semi-circle test are fulfilled.

Where one natural entrance point can be readily identified but not the other because of the smooth coast, Prescott has suggested a method designed to identify the second entrance point. He promotes the idea of measuring the distance between the natural entrance point and the point where that headland merges with the smooth coast in the depth of the bay. The same distance can then be projected along the smooth coast to fix an arbitrary entrance point.[65]

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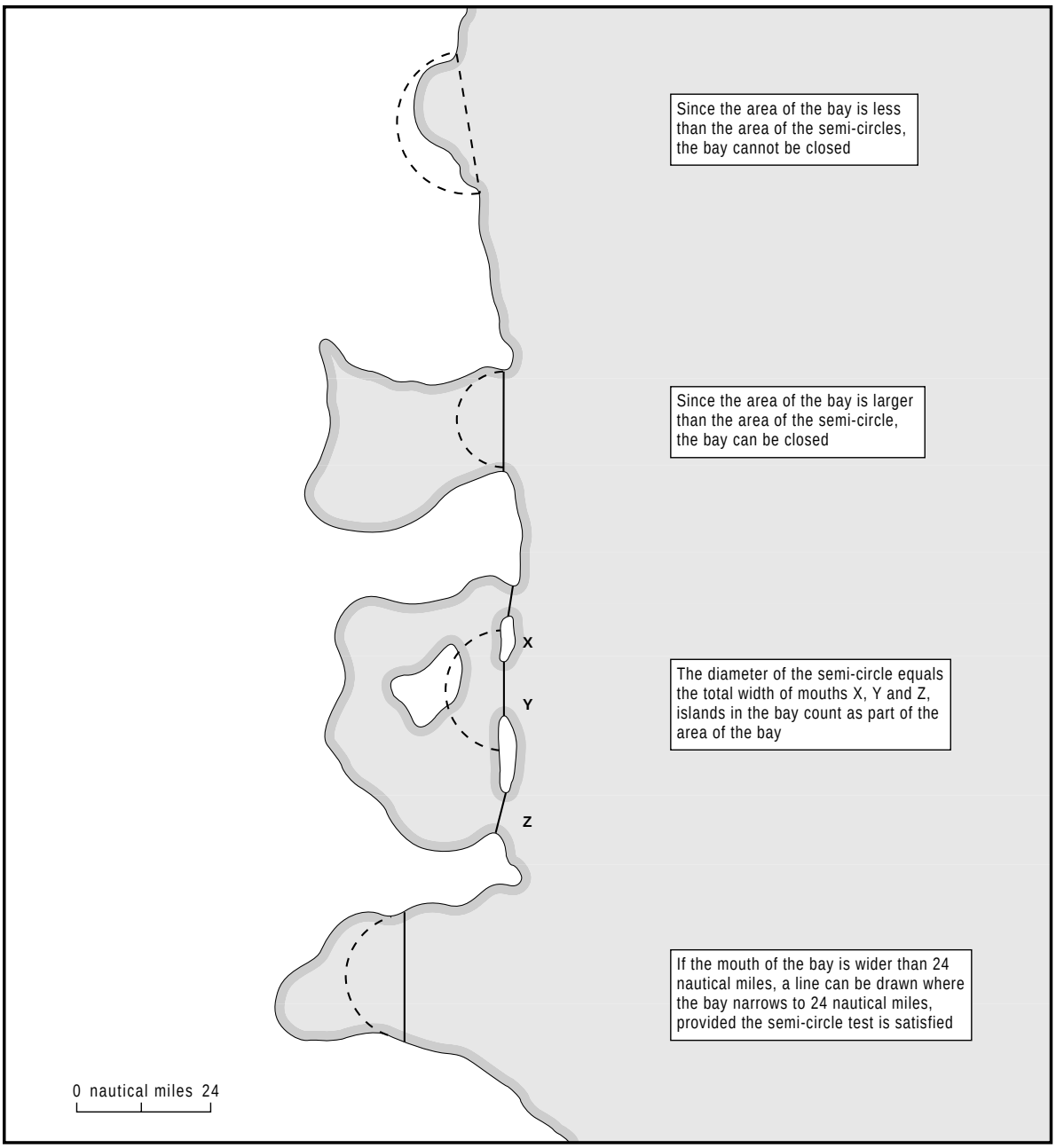
61 For a comprehensive legal analysis of bays see Westerman, 1987.
62 Prescott, 1985a: 51.
63 *Ibid.*: 53.
64 United Nations, 1989a: 28.
65 Prescott, 1985a: 56.

Figure 19: Bay Closing Lines



Where the natural entrance points of a bay are themselves smooth and rounded, it is similarly difficult to identify a single point representing the precise natural entrance. Shalowitz[66] has proposed constructing lines representing the general direction of both the coast outside and inside the bay. As the bay is itself a well-marked indentation where the azimuth of the coast alters significantly at the entrance point, the two general direction of the coast lines can be projected to intersect off the natural entrance point headland. The angle between these two lines can then be bisected and traced back to the headland so that a specific entrance point can be fixed where the bisector reaches the coast.[67]

66 Shalowitz, 1962: 64-65; Prescott, 1985a: 56; Hodgson and Alexander, 1972: 12.

67 Prescott, 1985: 55.

Another, rather less significant problem, relates to the area of the bay where subsidiary bays exist or rivers flow into the bay. Should the area of such subsidiary bays be included for the purposes of calculating the area versus diameter equation set out in the semi-circle test? Similarly, should straight lines be drawn across the mouths of rivers flowing into bays, thus restricting the area of the bay for that test? Clearly, these questions only become an issue if the area of the bay is close indeed to that of the semi-circle. It has further been suggested that if islands forming the mouths of a bay lie seaward of the direct line between the two mainland natural entrance points, they should not be joined by closing lines and the direct line should be used. A similar argument has been advanced in cases where the entrance points between such islands are not navigable.[68]

As far as subsidiary bays are concerned, if the shoreline of such bays forms part of the low-water line and amounts to part of the penetration of the sea into the land, they would seem to qualify under the terms of Article 10. The situation with regard to rivers interrupting the low-water line of a bay is less clear, particularly where such river mouths are wide and penetrated by tides. Presumably, that area affected by the tide, representing the penetration of the sea, could be claimed as being part of the surface area of the bay.[69]

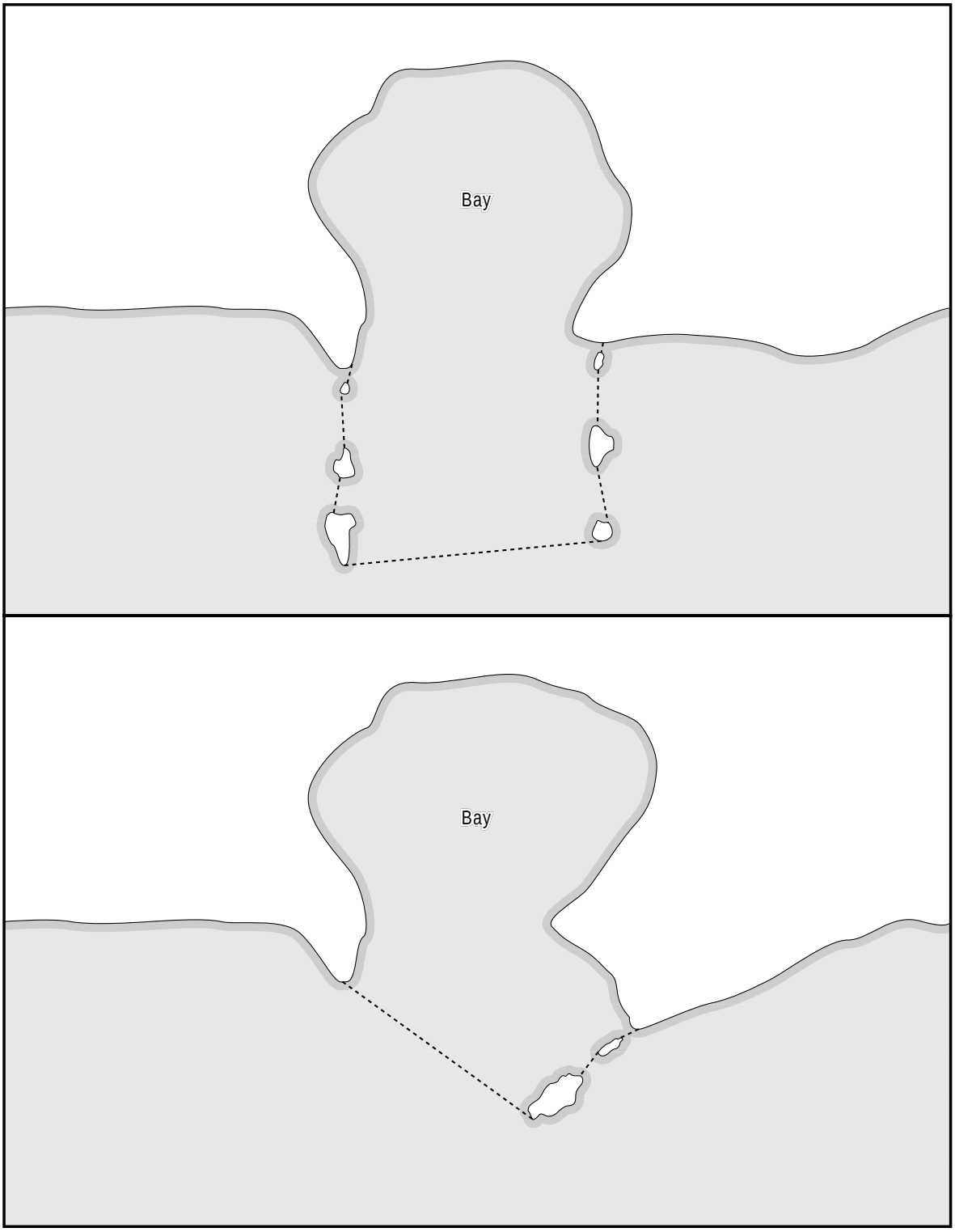
Concerning islands in the mouth of bays, Article 10 does not specify that they have to lie directly in the mouth of a particular bay. This in itself gives rise to some ambiguity over quite how far removed from the mouth of a bay such islands might realistically be (within the confines of the semi-circle test). Article 10 gives no guidance on this issue, nor does it specify that the channels between islands must be navigable. Nevertheless, Article 10, paragraph 5 does restrict bay closing lines to a maximum length of 24nm, a provision which must necessarily prevent any island in the mouth of a bay being more than 12nm offshore (see Figure 20). In addition, where the distance between the natural entrance points of a bay exceeds this distance, the bay closing line must be pulled back deeper into the bay in order to fulfil the requirements of Article 10 (see Figure 19).[70]

The first and last paragraphs of the Article outline three types of bay which are not covered by Article 10's restrictions. Firstly, Article 10 only applies to bays belonging to a single state. Secondly, Article 10 does not apply to historic bays and lastly it doesn't apply where Article 7 relating to straight baselines is being applied. The first and last of these three qualifications are precise and easily understood. That relating to historic bays is significantly more problematic. It is worth quoting Prescott[71] at length on this point:

> *In a Convention where many of the articles mean all things to all men the rules about bays are fairly clear. Unfortunately the force of this clear language is undermined by the disclaimer that the rules do not apply to historic bays. It would not be so damaging if there was a general understanding of the definition of historic bays, but that is the only place such features are mentioned in the Convention.*
>
> *Recourse to proclamations of authority over historic bays allows states to escape from the provisions concerning the drawing of closing lines and defining legal bays. This escape is simplified by the lack of codification of international law regarding historic bays.*

68 United Nations, 1989: 30.
69 *Ibid.*: 28.
70 Prescott, 1985: 59-60.
71 *Ibid.*: 60-61.

Figure 20: Islands in the Mouth of Bays



The concept of historic bays is clearly closely allied to the term 'historic waters'. Historic waters may on the one hand be viewed as constituting the maritime space enclosed within a historic bay. However, the regime of historic waters have also been applied to maritime areas outside bays. A prime example of such a 'non-bay' claim to historic waters is that made by Cambodia and Vietnam.

The question of historic bays and historic waters represents something of a longstanding, and thorny, issue. Indeed, proposals concerning this topic were discussed at the First and Third UN Conferences on the Law of the Sea. Perhaps the closest that the international community has come to codification of rules governing historic bays and waters was the First Conference's request to the UN to conduct a study of the subject which the UN Secretariat duly published in 1962. This report concluded that a state may indeed claim title to a bay on historic grounds if it can demonstrate that for a considerable period of time it has claimed the bay in question is internal waters, exercised its sovereignty there and that its claim has received the acquiescence of other states.[72]

This interpretation has been adopted by the United States Supreme Court in relation to federal-state cases and seems to reflect the current United States view, as expressed by Roach and Smith:[73]

> *To meet the international standard for establishing a claim to historic waters, a State must demonstrate its open, effective, long-term, and continuous exercise of authority over the body of water, coupled with acquiescence by foreign States to the exercise of that authority. The United States takes the position that an actual showing of acquiescence by foreign States in such a claim is required, as opposed to a mere absence of opposition.*[74]

The United States is of the opinion that few of the 18 claims to historic bays world-wide meet the international standard and has issued diplomatic protests concerning 15 of them.[75]

In the absence of formal codification, the application of historic bays and historic waters is governed by customary international law and this is supported by the International Court of Justice which found in the Tunisia-Libya Continental Shelf case that: *"...general international law...does not provide for a single 'régime' for 'historic waters' or 'historic bays', but for a particular régime for each of the concrete, recognised cases of 'historic waters' or 'historic bays'."*[76]

3.6 Ports and Roadsteads

Articles 11 and 12 of the UN Convention deal with ports and roadsteads respectively. The former stipulates that for delimiting the territorial sea *"the outermost permanent harbour works which form an integral part of the harbour system are regarded as forming part of the coast."* An example of such a feature would be a detached breakwater protecting the mouth of a port. The Article goes on to specifically exclude offshore installations and artificial islands from consideration as permanent harbour works. Article 11 is therefore clear and reasonably unambiguous. Although it is not specifically stated it may be assumed that the mouth of harbours may be closed by bay closing lines or included within straight baseline systems – this is, however, unlikely to have a significant impact on the extent of the territorial sea claimed.[77]

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72 Churchill and Lowe, 1988: 36-37.
73 Roach and Smith, 1996: 31.
74 *Ibid.*: 16.
75 For a comparative analysis of historic bay claims see Nixon (1981). See also O'Connell (1982: 417-438).
76 Cited in Churchill and Lowe, 1988: 36.
77 Prescott, 1985: 62.

Article 12 of the UN Convention largely repeats Article 9 of the Geneva Convention of 1958 and allows roadsteads used for loading, unloading and anchoring of ships which would otherwise fall wholly or partially outside the outer limit of the territorial sea to be included in the territorial sea. It would seem that this Article has become increasingly redundant. It was originally drafted when many states still claimed a 3nm breadth territorial sea. As the majority of states have moved towards a 12nm territorial sea, the incidence of roadsteads beyond the territorial sea has significantly diminished.[78]

3.7 Combination of Methods

It is worth pointing out here that Article 14 of UNCLOS provides that *"The coastal State may determine baselines in turn by any of the methods provided for in the foregoing articles to suit different conditions."* The *"foregoing articles"* referred to are those relating to normal baselines (Article 5), reefs (Article 6), straight baselines (Article 7), mouths of rivers (Article 9), bays (Article 10), ports and roadsteads (Articles 11 and 12).

3.8 Archipelagic Baselines

According to Article 46 of UNCLOS an archipelagic state is one constituted wholly by one or more archipelagos but may also include other islands. Archipelagos themselves are defined as:

> *…a group of islands, including parts of islands, interconnecting waters and other natural features which are so closely interrelated that such islands, waters and other natural features form an intrinsic geographical, economic and political entity, or which historically have been regarded as such.* (Article 46, (b)).

The provisions governing the use of archipelagic baselines are laid down in UNCLOS Article 47:

1. *An archipelagic State may draw straight archipelagic baselines joining the outermost points of the outermost islands and drying reefs of the archipelago provided that within such baselines are included the main islands and an area in which the ratio of the area of the water to the area of the land, including atolls, is between 1 to 1 and 9 to 1.*

2. *The length of such baselines shall not exceed 100 nautical miles, except that up to 3 per cent of the total number of baselines enclosing any archipelago may exceed that length, up to a maximum length of 125 nautical miles.*

3. *The drawing of such baselines shall not depart to any appreciable extent from the general configuration of the archipelago.*

4. *Such baselines shall not be drawn to and from low-tide elevations, unless lighthouses or similar installations which are permanently above sea level have been built on them or where a low-tide elevation is situated wholly or partly at a distance not exceeding the breadth of the territorial sea from the nearest island.*

[78] Kapoor and Kerr, 1986: 52.

5. *The system of such baselines shall not be applied by an archipelagic State in such a manner as to cut off from the high seas or the exclusive economic zone the territorial sea of another State.*

6. *If a part of the archipelagic waters of an archipelagic State lies between two parts of an immediately adjacent neighbouring State, existing rights and all other legitimate interests which the latter State has traditionally exercised in such waters and all rights stipulated by agreement between those States shall continue and be respected.*

7. *For the purpose of computing the ratio of water to land under paragraph 1, land areas may include waters lying within the fringing reefs of islands and atolls, including that part of a steep-sided oceanic plateau which is enclosed or nearly enclosed by a chain of limestone islands and drying reefs lying on the perimeter of the plateau.*

In order to apply archipelagic baselines in accordance with UNCLOS, therefore, five conditions have to be met:

- The claimant state's "*main islands*" must be included within the archipelagic baseline system.
- The ratio of water to land within the baselines must be between 1:1 and 9:1.
- The length of any single baseline segment must not exceed 100nm.
- No more than three percent of the total number of baseline segments enclosing an archipelago may exceed 125nm.
- Such baselines "*shall not depart to any appreciable extent from the general configuration of the archipelago.*" (Article 47, 3).

Figure 21: Indonesia's Archipelagic Baselines

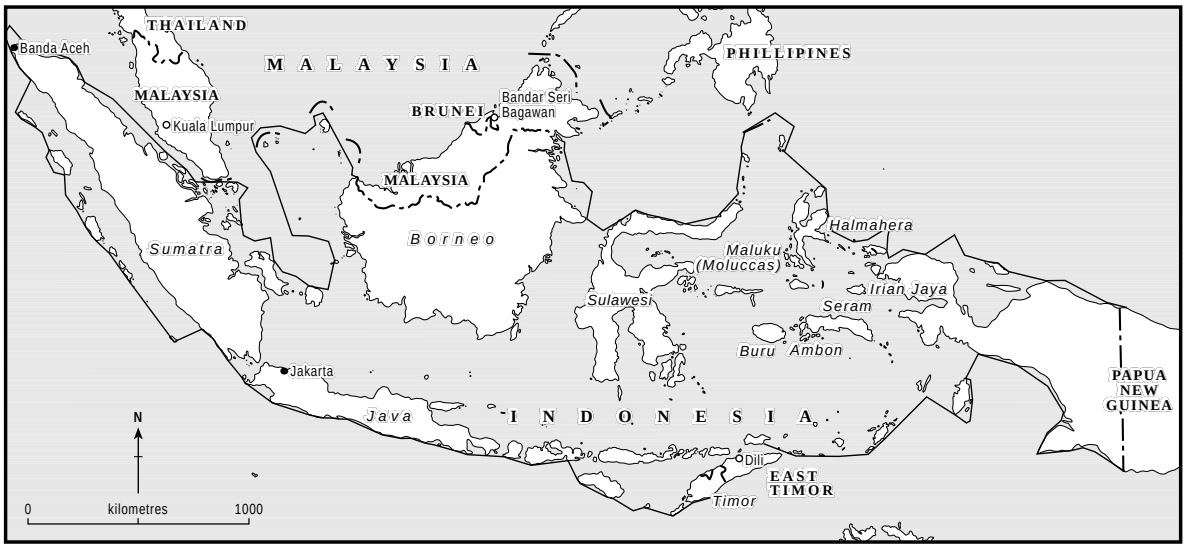


Figure 22: The Baselines of the Philippines

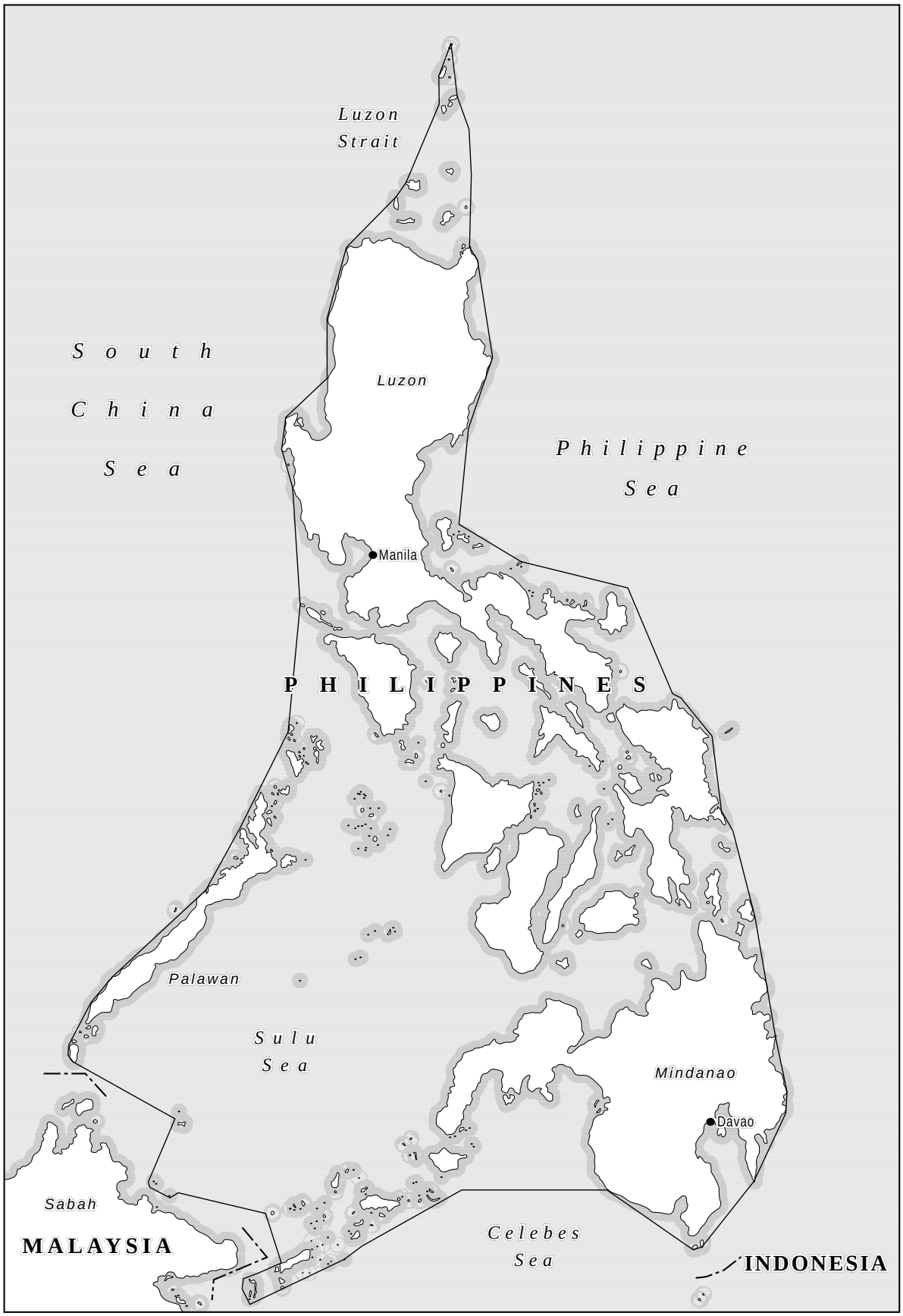
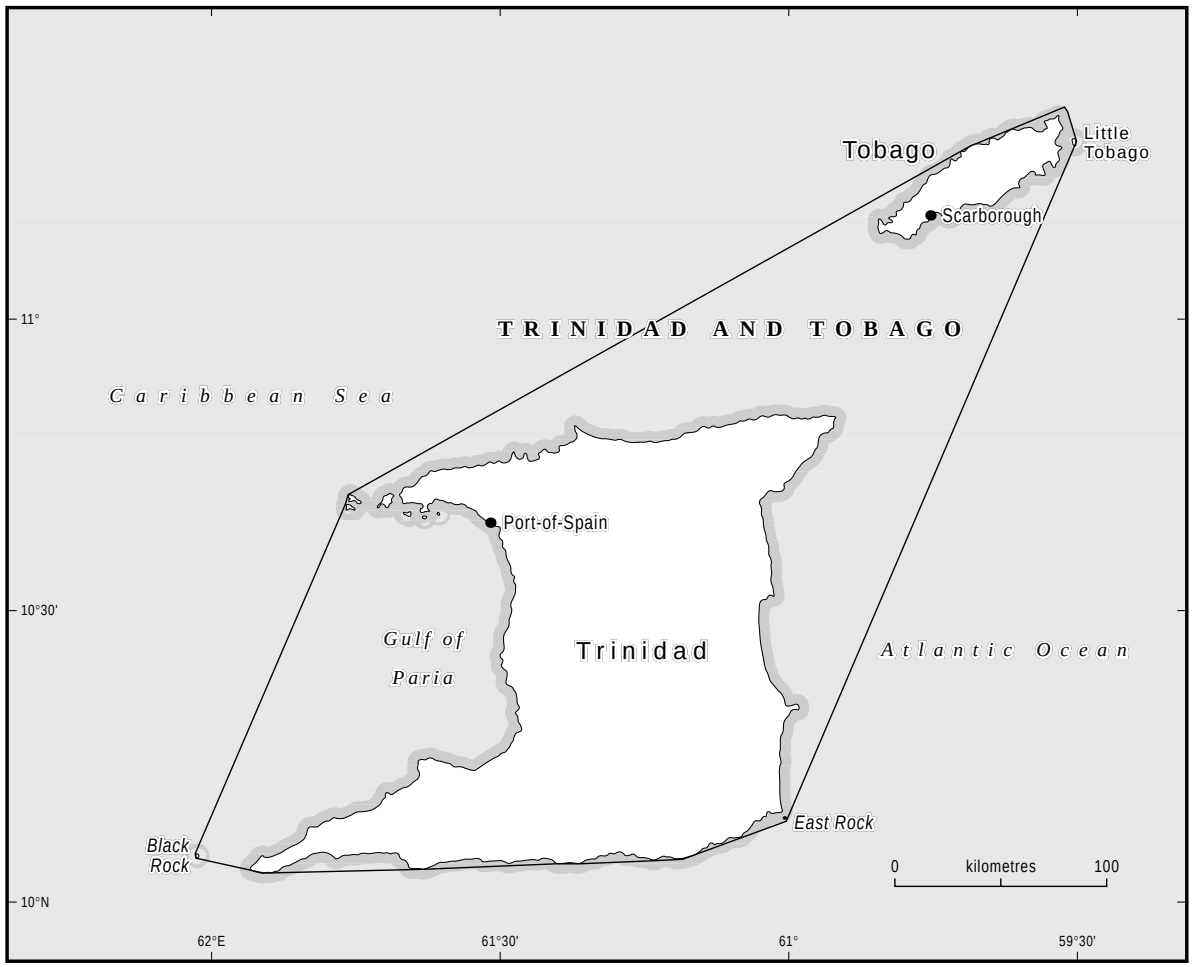


Figure 23: Trinidad and Tobago's Archipelagic Baselines

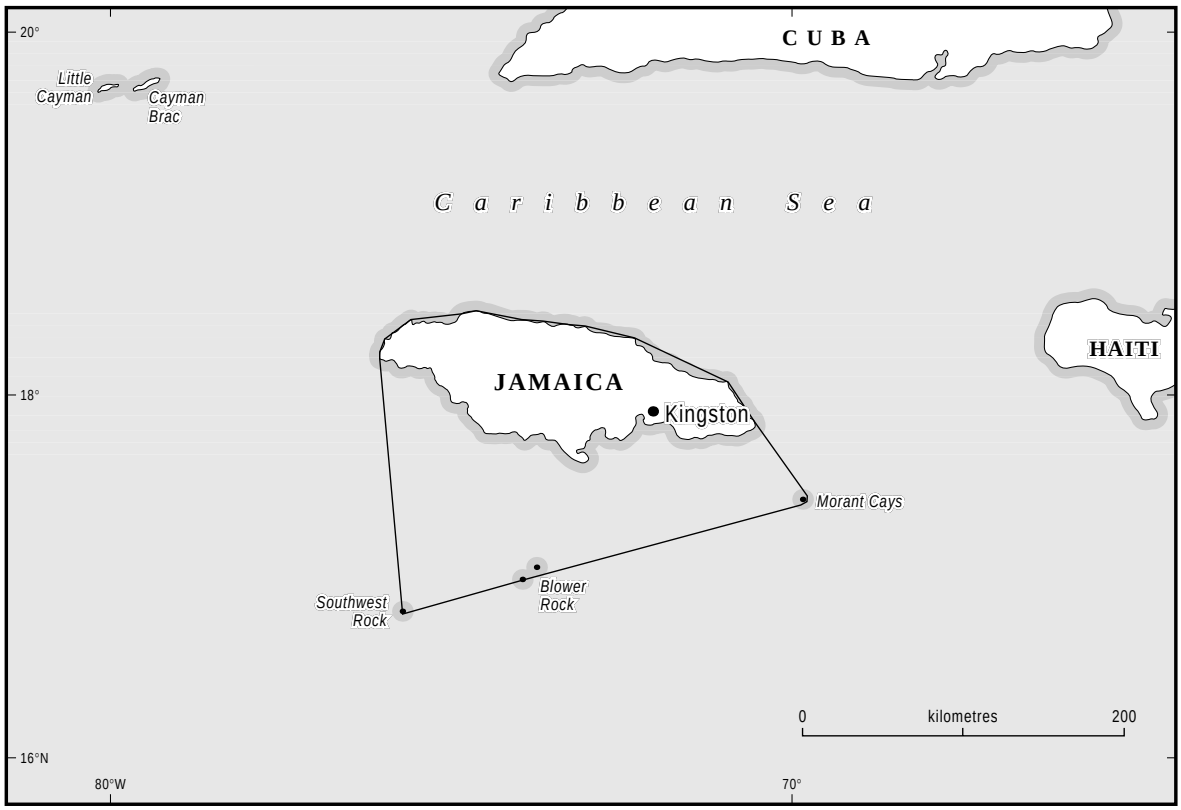


The concept of an archipelagic State was first formulated in UNCLOS. In contrast to the provisions for straight baselines, those relating to archipelagic baselines are technically reasonably robust, leave relatively little room for interpretation and represent a clear attempt to provide rational tests by which to determine the validity or otherwise of a particular archipelagic baseline system.

The five requirements laid down in Article 47 do, however, vary in their utility as unambiguous tests of the baselines system's validity. For example, it is clear that a particular baseline segment either is or is not over 125nm in length whereas the question of the baseline system conforming the shape of the archipelago is highly subjective as no objective test by which to measure such conformity is provided.

The expression the *"main islands"* is also open to varied interpretation as for different states this may be interpreted as meaning the largest islands, the most populous ones, the most economically productive ones or those of prime historical, religious or cultural significance.

Figure 24: Jamaica's Archipelagic Baselines



Similarly, the requirement that only 3% of baseline segments may exceed 100nm in length superficially appears to be a strict test. However, as Article 47 contains no restriction on the number of segments a country may designate in constructing its archipelagic baseline system, if a particular state desires a certain number of baseline segments in excess of 100nm all that would be required would be for it to increase the number of segments designated so that the 100nm-plus segments fall within the scope of the 3% rule.

Figures 21 and 22 illustrate two classic archipelagoes – those of Indonesia and the Philippines.[79] However there are several coastal States that claim archipelagic status that one would not necessarily associate with archipelagic status in the traditional sense. Trinidad and Tobago (Figure 23) and Jamaica (Figure 24) represent good examples. Nevertheless, both of these States meet the criteria laid down in Articles 46 and 47 and they must therefore be considered to be legitimate archipelagic States.

4. The Generation of Maritime Zones

The United Nations Convention on the Law of the Sea established the following maritime zones, each of which varies in the degree of exclusive rights and control afforded to a coastal state: internal waters; archipelagic waters; territorial sea; contiguous zone; exclusive economic zone

79 According to the Philippines legislation currently in force, these baselines are cited as straight baselines. However, it is understood that the Philippines is in the process of revising its legislation with the aim of claiming archipelagic baselines which are likely to closely resemble the current straight baselines claim around the archipelago.

(EEZ); continental shelf; high seas and international seabed area. Figure 25 illustrates the types of maritime zones that are available to a coastal state.

4.1 Internal Waters

These waters are defined in Article 8 of UNCLOS. They comprise all waters to landward of the territorial sea baseline. Internal waters form an integral part of the territory of the coastal State. There is no right of passage, except where the establishment of a straight baseline system has the effect of enclosing as internal waters areas which had not previously been considered as such, and were used for international navigation. In such waters a right of innocent passage is retained. An example in the UK is the passage between the Outer and Inner Hebrides, known as the Minch (see Figure 16).

4.2 Archipelagic Waters

These waters are defined in UNCLOS Article 49. They comprise the waters enclosed by the archipelagic baselines of an archipelagic State regardless of their depth or distance from the coast. The archipelagic state has sovereignty over these waters, which extends to the air space over them as well as to the seabed and subsoil and all the resources contained within them. An archipelagic state may draw closing lines for the delimitation of internal waters in accordance with the provisions of the Convention, within the area of the archipelagic waters.

All vessels have a right of innocent passage within archipelagic waters and a right of archipelagic sealane passage within, either the defined archipelagic sea lanes, or through routes used for international navigation through the archipelagic waters from one part of the EEZ or high seas to another part of the EEZ or high seas, where archipelagic sealanes have not been declared.

Once a coastal state has declared archipelagic status it places upon itself considerable responsibilities, perhaps the greatest of which to the international maritime community is the right of archipelagic sealane passage for international routes through the archipelago. Apart from the right of innocent passage for all vessels in archipelagic waters, as laid down in UNCLOS Article 52, Article 53 states:

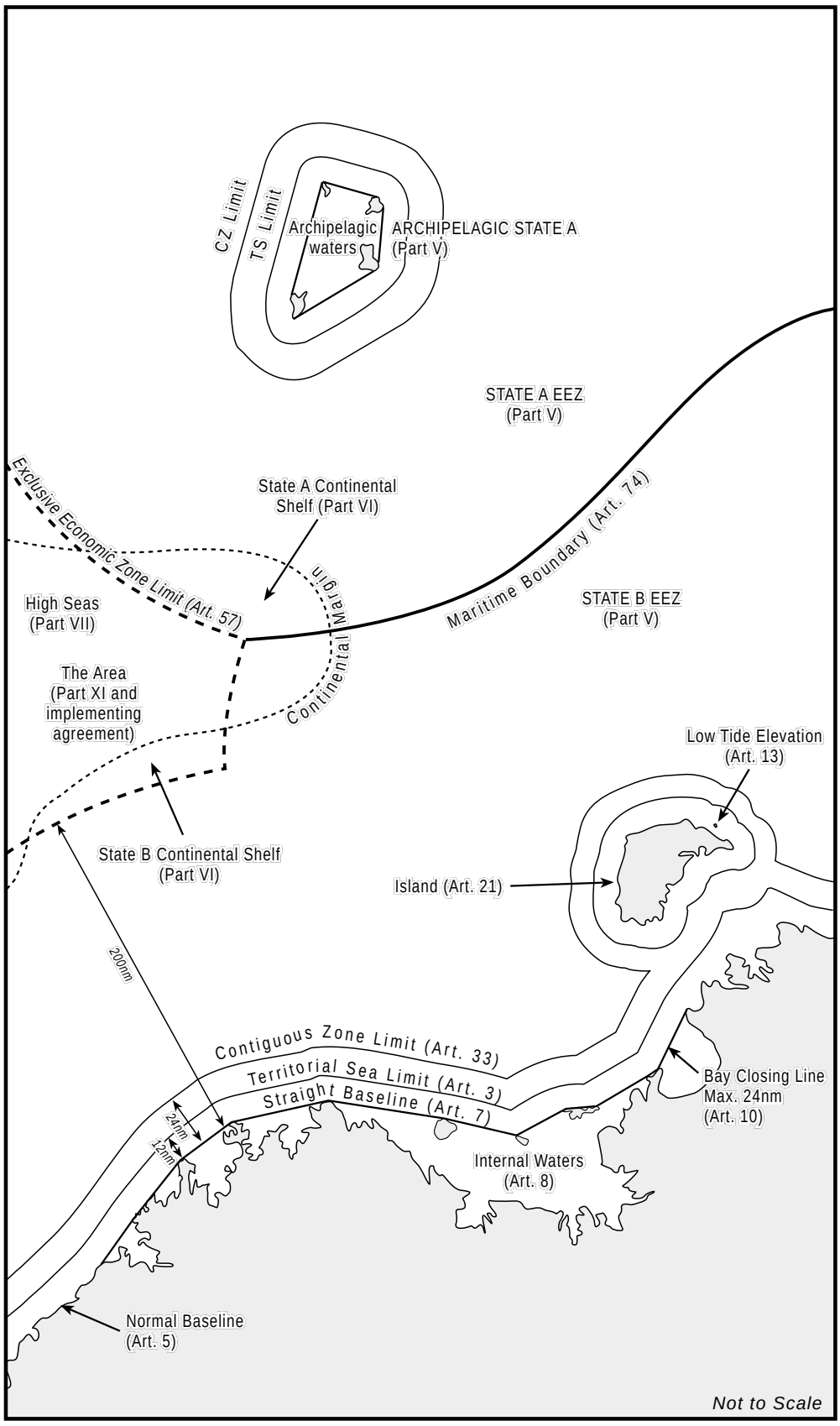
1. *An archipelagic State may designate sea lanes and air routes there-above, suitable for the continuous and expeditious passage of foreign ships and aircraft through or over its archipelagic waters and adjacent territorial sea.*

2. *All ships and aircraft enjoy the right of archipelagic sea lanes passage in such sea lanes and air routes.*

3. *Archipelagic sea lanes passage means the exercise in accordance with this Convention of the rights of navigation and overflight in the normal mode solely for the purpose of continuous, expeditious and unobstructed transit between one part of the high seas or an exclusive economic zone and another part of the high seas or an exclusive economic zone.*

4. *Such sea lanes and air routes shall traverse the archipelagic waters and the adjacent territorial sea and shall include all normal passage routes used as routes for international navigation or overflight through or over archipelagic waters and, within*

Figure 25: Schematic Map of Maritime Zones, Limits and Boundaries



such routes, so far as ships are concerned, all normal navigational channels, provided that duplication of routes of similar convenience between the same entry and exit points shall not be necessary.

5. *Such sea lanes and air routes shall be defined by a series of continuous axis lines from the entry points of passage routes to the exit points. Ships and aircraft in archipelagic sea lanes passage shall not deviate more than 25 nautical miles to either side of such axis lines during passage, provided that such ships and aircraft shall not navigate closer to the coasts than 10 per cent of the distance between the nearest points on islands bordering the sea lane.*

6. *An archipelagic State which designates sea lanes under this article may also prescribe traffic separation schemes for the safe passage of ships through narrow channels in such sea lanes.*

7. *Any archipelagic State may, when circumstances require, after giving due publicity thereto, substitute other sea lanes or traffic separation schemes for any sea lanes or traffic separation schemes previously designated or prescribed by it.*

8. *Such sea lanes and traffic separation schemes shall conform to generally accepted international regulations.*

9. *In designating or substituting sea lanes or prescribing or substituting traffic separation schemes, an archipelagic State shall refer proposals to the competent international organisation with a view to their adoption. The organisation may adopt only such sea lanes and traffic separation schemes as may be agreed with the archipelagic State, after which the archipelagic State may designate, prescribe or substitute them.*

10. *The archipelagic State shall clearly indicate the axis of the sea lanes and traffic separation schemes designated or proscribed by it on charts to which due publicity shall be given.*

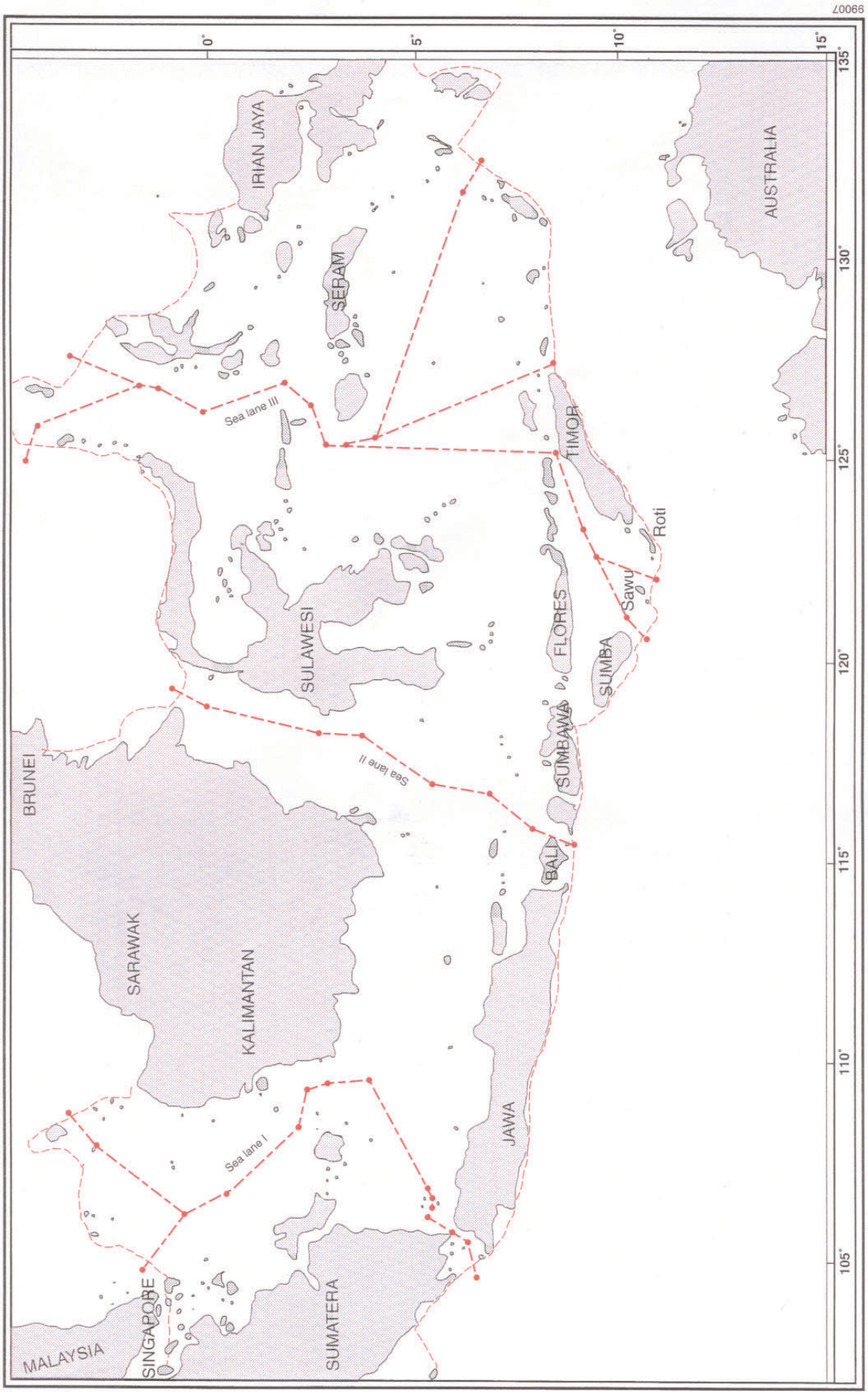
11. *Ships in archipelagic sea lanes passage shall respect applicable sea lanes and traffic separation schemes established in accordance with this article.*

12. *If an archipelagic State does not designate sea lanes or air routes, the right of archipelagic sea lanes passage may be exercised through the routes normally used for international navigation.*

The first archipelagic State to submit sea lanes proposals to the competent international organisation, the International Maritime Organization (IMO) was Indonesia. Although not yet in force, Indonesia's proposals for three north/south archipelagic sea lanes were approved by the Maritime Safety Committee at its 69th session in May 1998. However this is only a partial designation and further archipelagic sea lanes will be required to satisfy the requirements of the IMO, particularly an east/west route from the southern end of the Malacca Strait to the Arafura Sea (see Figure 26).

It is vitally important for the archipelagic State to designate archipelagic sea lanes that both conform to the requirements of UNCLOS and the international maritime community as the user States. An adequate number of sea lanes will be required, covering all the major routes used for

Figure 26: Indonesia's Proposed Archipelagic Sealanes



international navigation and all of which must be safe for surface and sub-surface navigation and overflight.

This may require the archipelagic state to carry out extensive hydrographic surveys to bring the navigational charts, covering the proposed routes, up to modern standards. The provision of extra navigational aides may also be required. These could include the provision of lighthouses, buoys and in some areas the provision of radar coverage and vessel traffic services (VTS).

In narrow sections of the proposed archipelagic sea lane the archipelagic state may propose separation schemes, which will also have to be submitted for adoption by the IMO.

The axis of the sea lanes must also be depicted on the charts of the area, together with any separation schemes that are adopted and any new navigational aids that have been provided. This will require the archipelagic state to produce new charts or new editions of existing charts as well as providing details to the world-wide charting nations for depiction on their own charts.

This places a considerable responsibility upon the archipelagic State but is the price that will have to be paid for the advantages that archipelagic status confers upon the archipelagic State.

4.3 Territorial Sea

This is a band of water to seaward of the territorial sea baseline with a maximum permitted breadth of 12nm as laid down in UNCLOS Article 3. The coastal State enjoys sovereignty over the territorial sea and it is under the control and jurisdiction, of the coastal State. All vessels enjoy the right of innocent passage through the territorial sea in accordance with UNCLOS Article 17. However the coastal State has the right to prevent passage which is not innocent and to expel any vessel which fails to comply with local regulations or the rules on innocent passage laid down in UNCLOS Article 19 which are as follows:

> *Passage of a foreign ship shall be considered to be prejudicial to the peace, good order or security of the coastal State if in the territorial sea it engages in any of the following activities:*
>
> *a) any threat or use of force against the sovereignty, territorial integrity or political independence of the coastal State or in any other manner in violation of the principles of international law embodied in the Charter of the United Nations;*
> *b) any exercise or practice with weapons of any kind;*
> *c) any act aimed at collecting information to the prejudice of the defence or security of the coastal State;*
> *d) any act of propaganda aimed at affecting the defence or security of the coastal State;*
> *e) the launching, landing or taking on board of any aircraft;*
> *f) the launching, landing or taking on board of any military device;*
> *g) the loading or unloading of any commodity, currency or person contrary to the customs, fiscal, immigration or sanitary laws and regulations of the coastal State;*
> *h) any act of wilful and serious pollution contrary to this Convention;*
> *i) any fishing activities;*
> *j) the carrying out of research or surveying activities;*

k) any act aimed at interfering with any systems of communication or any other facilities or installations of the coastal State;
l) any other activity not having a direct bearing on passage.

The coastal State is allowed to temporarily suspend the right of innocent passage through the territorial sea, except in international straits, where transit passage rights apply, if such action is essential for the protection of its security. Such suspension must be applied without discrimination between ships of different States and can only be brought into effect after due notice.

It is also worth noting that a coastal State is not compelled to claim a territorial sea of 12nm. For example, Greece claims a 6nm territorial sea (as does Turkey with respect to the Aegean Sea). It is perfectly acceptable to claim a limit less than the maximum, however, it is illegal to claim a limit beyond 12nm. Thus, Syria and Somalia's claims to 35nm and 200nm breadth territorial seas are in contravention of UNCLOS.

4.4 Contiguous Zone

The definition of the contiguous zone is laid down in UNCLOS Article 33. The zone may not extend beyond 24nm from the territorial sea baseline. If a coastal States claims a contiguous zone, it may exercise the control necessary to:

(a) prevent infringements of its customs, fiscal, immigration or sanitary laws and regulations within its territory or territorial sea;
(b) punish infringement of the above laws and regulations committed within its territory or territorial sea.

4.5 Exclusive Economic Zone

Part V of UNCLOS lays down the rights and regulations of the EEZ. Each coastal State has the right to claim an EEZ out to 200nm from the territorial sea baseline. The rights, jurisdiction and duties of the coastal State in the EEZ are laid down as follows:

1. In the exclusive economic zone, the coastal State has:
(a) sovereign rights for the purpose of exploring and exploiting, conserving and managing the natural resources, whether living or non-living, of the waters superjacent to the sea-bed and of the sea-bed and its subsoil, and with regard to other activities for the economic exploitation and exploration of the zone, such as the production of energy from water, currents and winds:
(b) jurisdiction as provided for in the relevant provisions of this Convention with regard to:
(i) the establishment and use of artificial islands, installations and structures;
(ii) marine scientific research;
(iii) the protection and preservation of the marine environment;
(c) other rights and duties provided for in this Convention.

2. *In exercising its rights and performing its duties under this Convention in the exclusive economic zone, the coastal State shall have due regard to the rights and duties of other States and shall act in a manner compatible with the provisions of this Convention.*

3. *The rights set out in this Article with respect to the sea-bed and subsoil shall be exercised in accordance with Part VI [Continental Shelf].*

All States enjoy the rights of the freedoms of navigation and overflight and of the laying of submarine cables and pipelines in an EEZ.[80] Part V of UNCLOS also gives coastal states exclusive rights over artificial islands, installations and other such structures within their EEZs (Article 60) as well as providing coastal states with considerable rights and responsibilities in relation to the conservation and utilisation of living resources in their EEZs (Articles 61-68).

Of the 169 coastal States and dependencies, excluding Antarctica, some 115 already claim an EEZ (see Appendix 2).[81] An example of a coastal State that has not is the UK which acceded to UNCLOS on 24 August 1997. It has no full EEZ legislation in place to date, however legislation does exist for a 200nm Fisheries Zone (Figure 27), amended following the UK's accession, continental shelf provisions and pollution controls covering a 200nm zone.

4.6 Continental Shelf

Part VI of the Convention deals with the legal regime of the continental shelf. Article 76 of UNCLOS provides a complex definition of the continental shelf and the extent to which coastal States can lay claim to continental shelf jurisdiction beyond 200nm from the coast (see Section 5.2). Article 77 details the rights of coastal states over the continental shelf:

1. *The coastal State exercises over the continental shelf sovereign rights for the purpose of exploring it and exploiting its natural resources.*

2. *The rights referred to in paragraph 1 are exclusive in the sense that if the coastal State does not explore the continental shelf or exploit its natural resources, no one may undertake these activities without the express consent of the coastal State.*

3. *The rights of the coastal State over the continental shelf do not depend on occupation, effective or notional, or on any express proclamation.*

4. *The natural resources referred to in this Part consist of the mineral and other non-living resources of the seabed and subsoil together with living organisms belonging to sedentary species, that is to say, organisms which, at the harvestable stage, either are immobile on or under the seabed or are unable to move except in constant physical contact with the seabed or the subsoil.*

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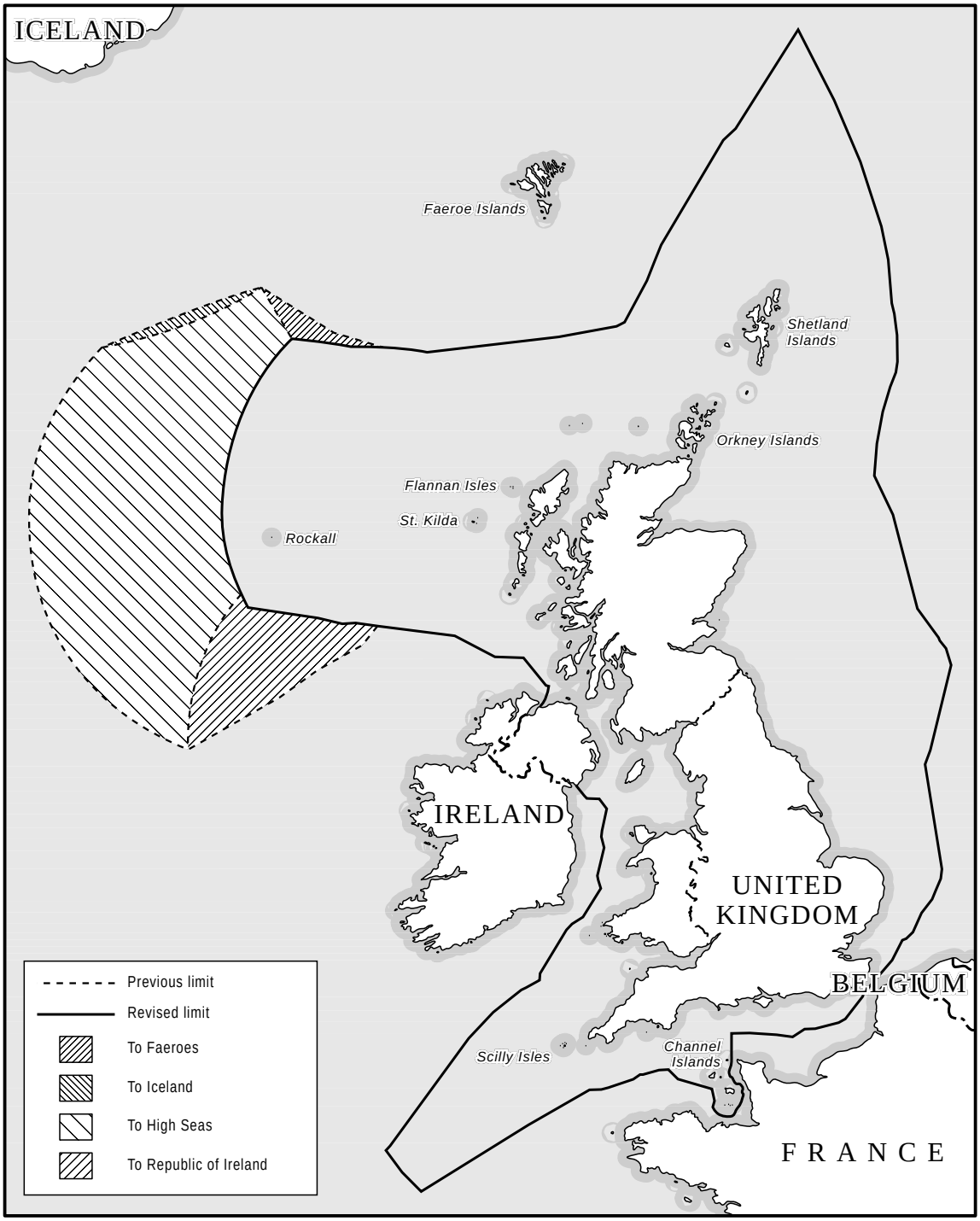
80 The right to lay submarine pipelines and cables on the continental shelf underlying the EEZ is governed by Article 79 of UNCLOS relating to the continental shelf (see continental shelf section).

81 Figures from *Annual Admiralty Notice to Mariners No. 12* which is issued in January each year and updated in the summer, listing all known national maritime claims to jurisdiction over the territorial sea, contiguous zone, exclusive economic zone and fishery zones, where no EEZ is claimed.

Figure 27: The United Kingdom's Fishery Limits



Article 78 provides that the rights of coastal states over the continental shelf do not affect the legal status of the superjacent waters or of the airspace above them and explicitly states that such rights *"must not infringe or result in any unjustifiable interference with navigation and freedoms of other States"* as provided for elsewhere in the Convention. The right to lay submarine pipelines and cables on the continental shelf is governed by Article 79 of UNCLOS which provides that:

1. *All States are entitled to lay submarine cables and pipelines on the continental shelf, in accordance with the provisions of this article.*

2. *Subject to its right to take reasonable measures for the exploration of the continental shelf, the exploitation of its natural resources and the prevention, reduction and control of pollution from pipelines, the coastal State may not impede the laying or maintenance of such cables or pipelines.*

3. *The delineation of the course for the laying of such pipelines on the continental shelf is subject to the consent of the coastal State.*

4. *Nothing in this Part affects the right of the coastal State to establish conditions for cables or pipelines entering its territory or territorial sea, or its jurisdiction over cables and pipelines constructed or used in connection with the exploration of its continental shelf or exploitation of its resources or the operations of artificial islands, installations and structures under its jurisdiction.*

5. *When laying submarine cables or pipelines, States shall have due regard to cables or pipelines already in position. In particular, possibilities of repairing existing cables or pipelines shall not be prejudiced.*

The coastal state therefore has strictly limited rights to govern the laying of pipelines or cables by other states on its continental shelf. There does, however, appear to be some potential for tension between the right of other states to lay cables and pipelines on the coastal state's continental shelf and that coastal state's right to approve the cable or pipeline route.

Where two parties to UNCLOS are involved, such a dispute could become subject to the Convention's compulsory dispute settlement procedures which provide for a binding decision through third-party adjudication – a process that can be initiated by either party.

It is worth noting that, in contrast to other zones of maritime jurisdiction, continental shelf rights do not have to be specifically claimed under UNCLOS – every coastal state has one, whether formally claimed or not:

> *The rights of the coastal State over the continental shelf do not depend on occupation, effective or notional, or on any express proclamation* (Article 77).

It is also important to note that rights to the seabed and subsoil acquired through EEZ claims are still governed in accordance with the provisions in Part VI of UNCLOS relating to the continental shelf.

4.7 The High Seas

The high seas are considered to be that part of the oceans beyond the national jurisdiction of any state, i.e. beyond all claimed territorial sea and EEZs. Key attributes of the high seas include: open access to all states; unrestricted freedom of navigation and overflight; and, subject to provisions elsewhere in the Convention, freedom to construct artificial islands and installations, freedom of fishing and freedom of scientific research (Article 87). However, *"the*

high seas shall be reserved for peaceful purposes" (Article 88) and *"no State may validly purport to subject any part of the high seas to its sovereignty"* (Article 89).

4.8 The Area

Beyond the limits of national jurisdiction UNCLOS established a new zone, *"the Area"* which is administered by the International Sea-bed Authority (ISBA), based in Kingston, Jamaica, on behalf of the States Parties and for the benefit of *"mankind as a whole"* (Article 137). The ISBA's function is controlled by the States Parties in accordance with Part XI of the Convention and the Agreement Relating to the Implementation of Part XI of the United Nations Convention on the Law of the Sea of 10 December 1982. At the time of going to press the ISBA had a Secretary-General and an approved establishment of 37 posts. The States Parties form two executive committees – the Finance Committee and the Technical and Legal Committee. The substantive work of the Authority has covered the following topics to date:

- The Formulation of the rules, regulations and procedures for prospecting and exploration for polymetallic nodules in the Area. These Regulations were approved by the General Assembly on 13 July 2000 (UN Doc. ISBA/6/A/18 dated 4 October 2000).

- The review of the status of the registered pioneer investors. The present pioneer investors are:
  - Government of India.
  - Institut Francais de Recherche pour L'exploitation de la Mer/L'Association Francaise pour L'etude et la Recherche des Nodules (IFREMER/AFERNOD) (France).
  - Deep Ocean Resources Development Company (DORD) (Japan)
  - Yuzhmorgeologiya (Russia)
  - China Ocean Mineral Resources Research and Development Association (COMRA)(China)
  - Interoceanmetal Joint Organization (Bulgaria, Cuba, Czech Republic, Slovakia, Poland, Russia, Republic of Korea).

- Training.

- Guidelines for the Assessment of the Possible Environmental Impacts Arising from Exploration for Polymetallic Nodules.

- Information and Data Relating to the International Seabed Area. This includes a resource assessment of the areas reserved for the Authority, the formation of a central data repository and an environmental database.

- The Holding of Workshops on Proposed Technologies for Seabed Mining. The first workshop was held in 1999.

- Resources other than Polymetallic Nodules. These include polymetallic sulphides and cobalt-rich crusts.

5. The Generation of Maritime Limits

5.1 The Outer Limits of the Territorial Sea, Contiguous Zone and the EEZ

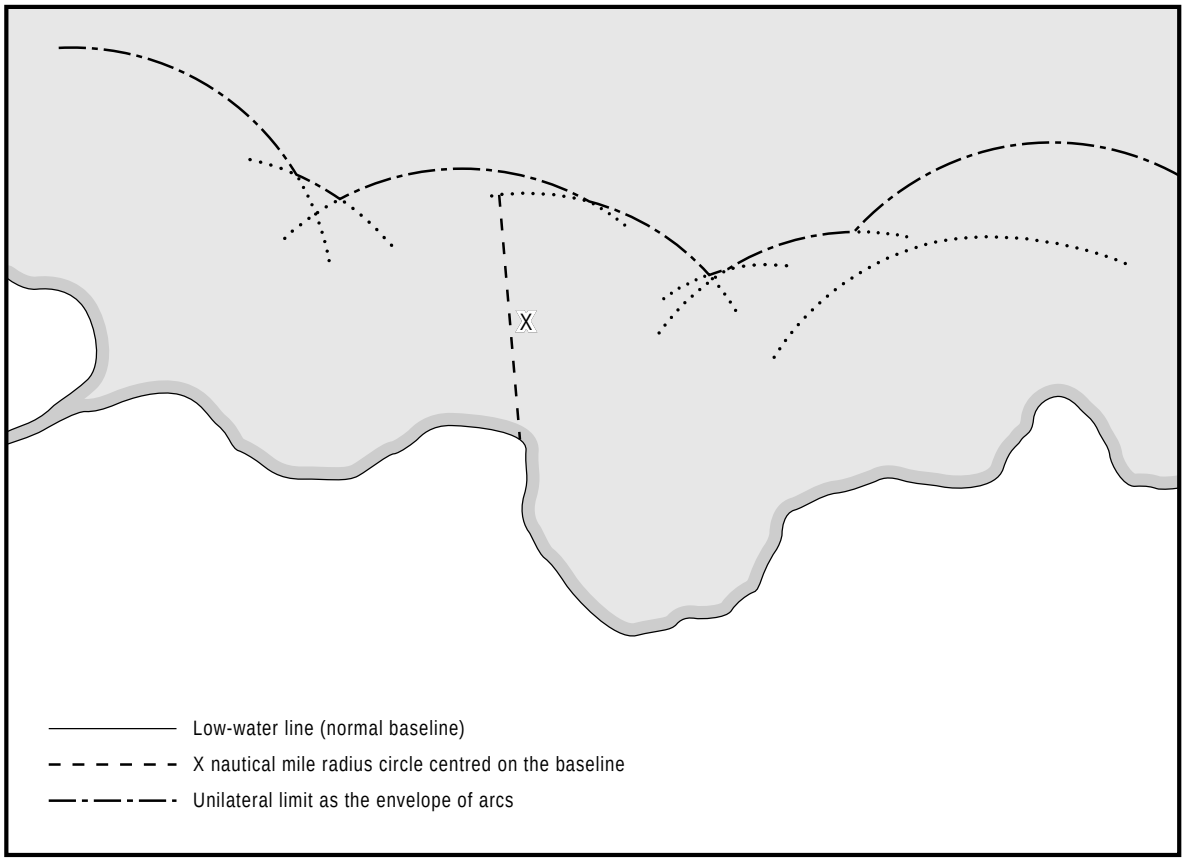
The determination of the outer limit of maritime zones requires knowledge of the relevant territorial sea basepoints. The outer limit may then be constructed as an envelope of arcs from the relevant basepoints. The length of the arcs is determined by the breadth of the maritime zone for which the outer limit is being constructed – 12nm for the territorial sea, 24nm for the contiguous zone and 200nm for the EEZ (see Figure 28).

Put another way the outer limit can be defined as being *"the locus of the centre of a circle the circumference of which is always in contact with the coastline, that is, with the low-water line or the seaward limits of inland waters."*[82] Thus, every point of the outer limit is the same distance – 12nm, 24nm or 200nm respectively – from the relevant basepoints.

Maritime limits calculated from straight baselines, archipelagic baselines and bay closing lines will approximate parallel lines drawn tangentially to and from the arcs calculated from the straight/archipelagic turning points or the bay closing line terminal points.

The outer limits of maritime zones, it must be stressed, need to be calculated rigorously by recourse to geodetic methods. One cannot accurately draw such limits graphically.

Figure 28: An Envelope of Arcs



82 Antunes, 2001.

5.2 The Outer Limits of the Continental Shelf

The outer limits of the continental shelf can be regarded as something of a special case – distinct from the outer limits of other maritime zones. Article 76 of UNCLOS defines the continental shelf. It is perhaps one of the most complex articles in the whole Convention. The shelf is defined as:

> *The continental shelf of a coastal State comprises the sea-bed and subsoil of the submarine area that extends beyond its territorial sea throughout the natural prolongation of its land territory to the outer edge of the continental margin, or to a distance of 200 nautical miles from the baselines from which the breadth of the territorial sea is measured where the outer edge of the continental margin does not extend up to that distance.*

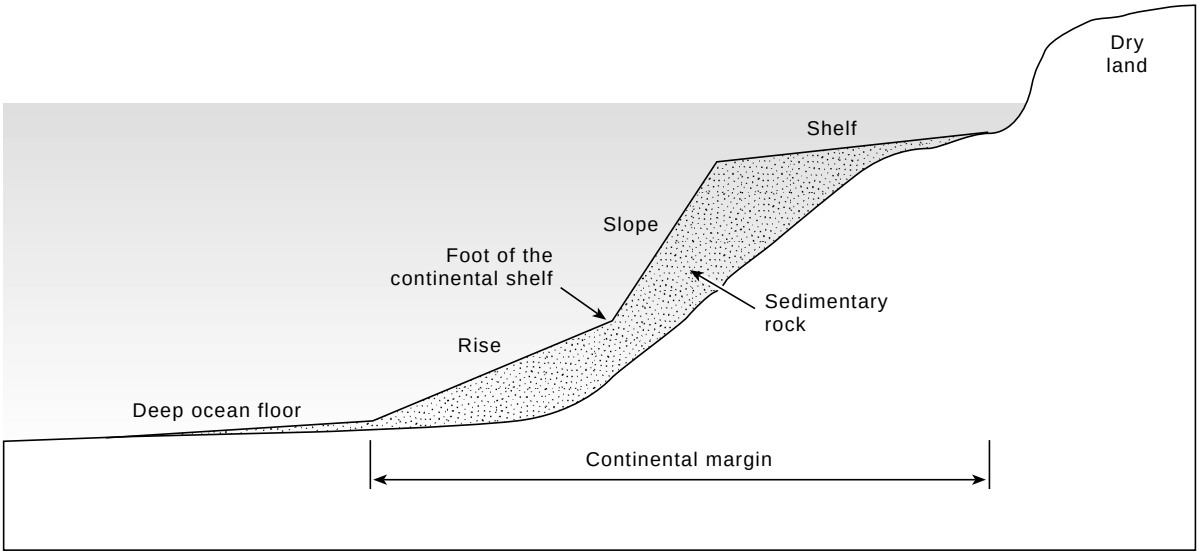
The continental margin is defined as:

> *The continental margin comprises the submerged prolongation of the land mass of the coastal State, and consists of the sea-bed and subsoil of the shelf, the slope and the rise. It does not include the deep ocean floor with its oceanic ridges or the subsoil thereof.*

Figure 29 illustrates this area. If the outer limit edge of the continental margin extends beyond 200nm from the territorial sea baseline, its extent is determined either by:

> *…a line through the outermost fixed points at each of which the thickness of sedimentary rock is at least 1% of the shortest distance from such point to the foot of the continental slope;*
> or,
>
> *…a line through fixed points not more than 60nm from the foot of the continental slope.*

Figure 29: The Continental Margin



The foot of the slope is defined as:

> *In the absence of evidence to the contrary, the foot of the slope shall be determined as the point of maximum change in the gradient at its base.*

However, the Convention stipulates that the outermost limit shall not exceed one of the following:

> *The fixed points comprising the line of the outer limits of the continental shelf on the sea-bed...shall either not exceed 350 nautical miles from the baseline from which the breadth of the territorial sea is measured or shall not exceed 100 nautical miles from the 2,500 metre isobath, which is a line connecting the depth of 2,500 metres.*

Figure 30 illustrates these various possible limits. They collectively place an enormous challenge on both the technical and legal experts in this field. Technical experts in the fields of geology, oceanography, hydrography and geophysics will be required to determine the natural prolongation of the continental crust, the foot of the continental slope, the depth and extent of any sedimentary rocks beyond the foot of the slope, and the delimitation of the 2,500 metre isobath. All these tasks will require expertise at the forefront of present technologies.

Once these data sets have been gathered and interpreted by the various technical experts, the lawyers will be required to ensure that the interpretation put onto this data meets both the requirements and expectations of the coastal State and the legal requirements of Article 76. The results will then have to be presented to the Commission on the Limits of the Continental Shelf (CLCS), in accordance with Article 76(8) and Article 4 of Annex II, which states:

Figure 30: The Continental Shelf

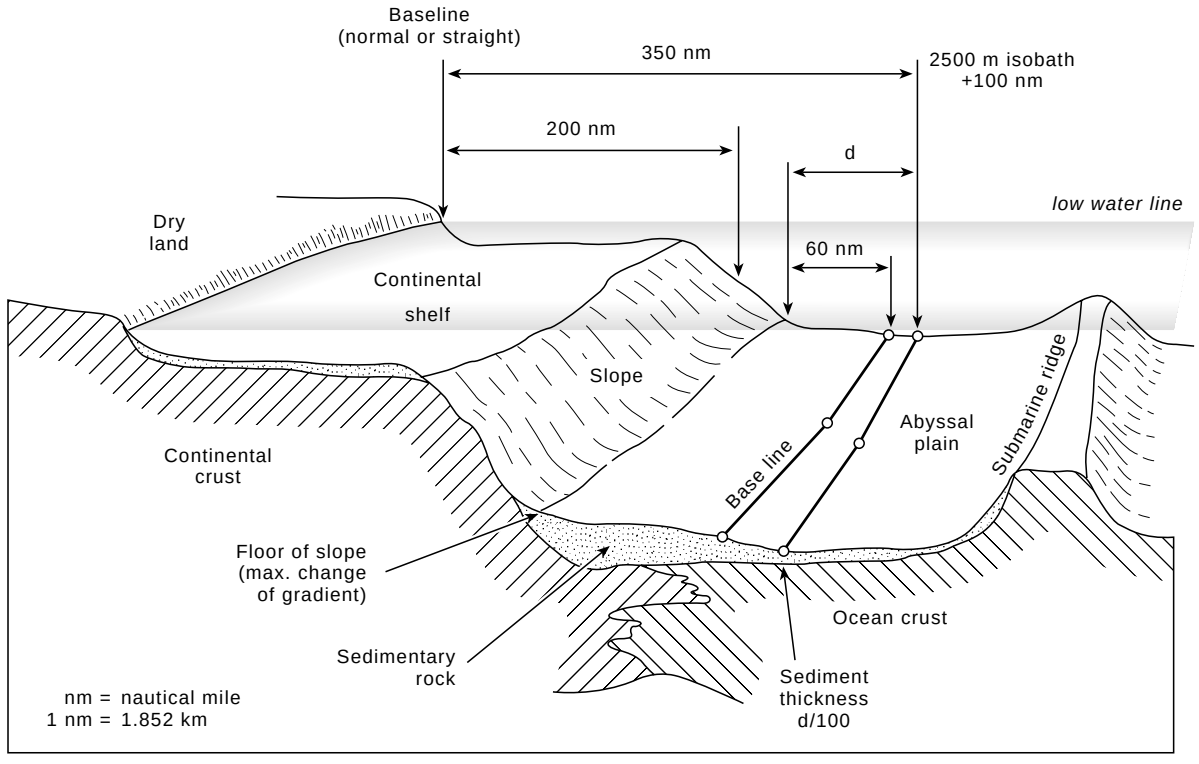
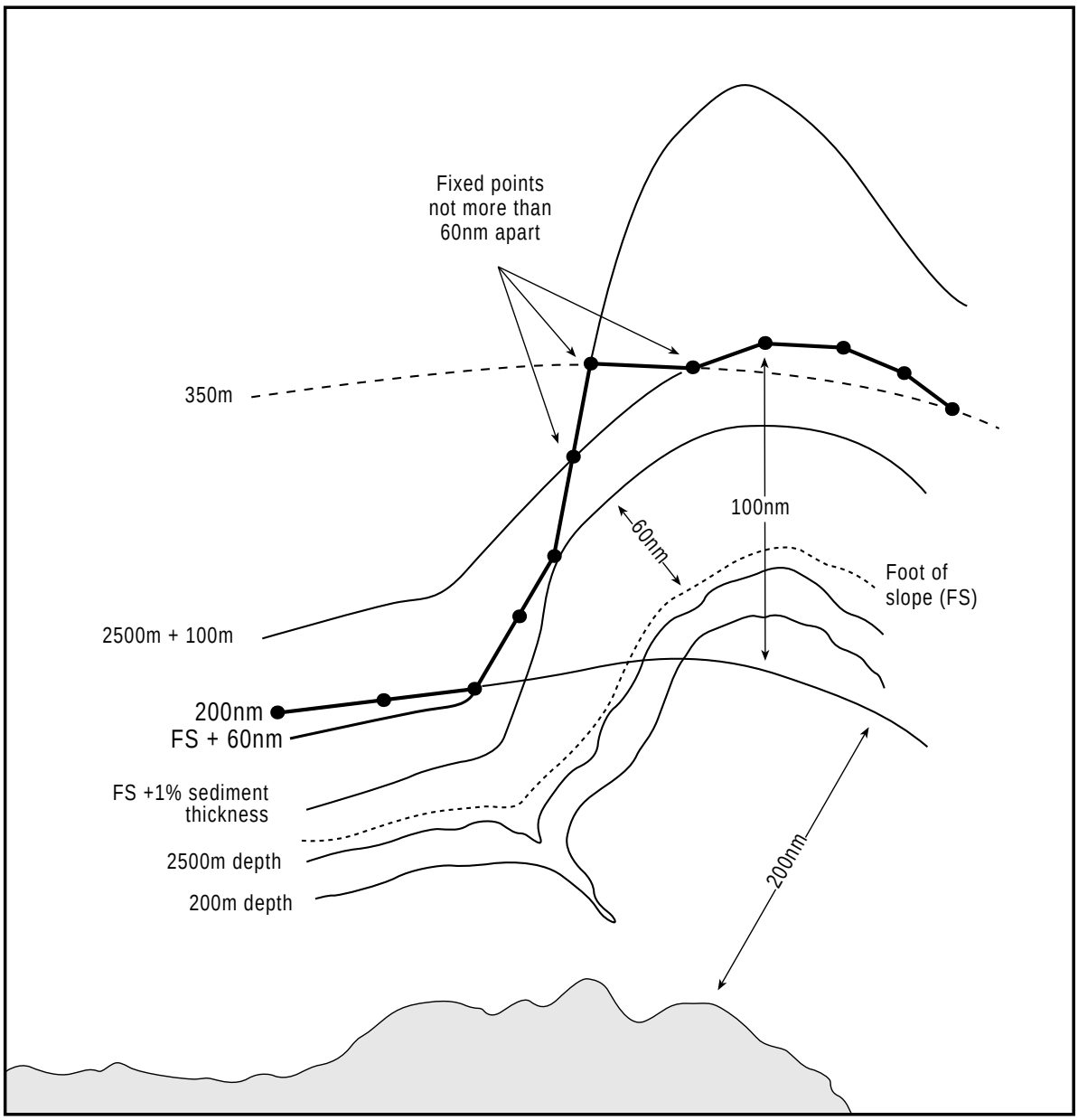


Figure 31: Royal Society Diagram of Continental Shelf Limits



Where a coastal State intends to establish, in accordance with Article 76, the outer limits of its continental shelf beyond 200 nautical miles, it shall submit particulars of such limits to the Commission along with supporting scientific and technical data as soon as possible but in any case within 10 years of the entry into force of this Convention for that State.

Following a debate at the Eleventh Meeting of the States Parties from 14-18 May 2001, it was decided that for a State for which the Convention entered into force before 13 May 1999, the date of commencement of the ten year time period for making submissions to the Commission is 13 May 1999. However it was also agreed that States that were in a position to do so should make every effort to make submissions within the time period established by the Convention. (UN Doc. SPLOS/72 dated 29 May 2001).

The CLCS was set up under Annex II on the basis of equitable geographical representation. It was elected in March 1997 and has generally held two session per year since its inauguration.

To date, however, these sessions have dealt with the *Modus Operandi*,[83] the Rules of Procedure[84] and the Scientific and Technical Guidelines[85] of the Commission. At the time of going to press the Commission had yet to hear its first claim for a continental shelf beyond 200nm.

There are clear possibilities for a coastal State to use a mix of criteria for defining the outer limits of its continental shelf. At no point does Article 76 state that only one method of defining a continental shelf can be utilised. The well documented Royal Society diagram illustrating all the possible limits of a continental shelf under Article 76 (Figure 31) has been accepted by both technical and legal experts as correctly illustrating the possibilities available to the coastal State.

The CLCS has no remit to look at a coastal state's claim to a continental shelf beyond 200nm if the claimed area overlaps that of a second or even a third state's claims, without the relevant state's consent. It is therefore the states' responsibilities either to agree their continental shelf boundaries, or agree that the outer limit of the whole relevant area should be submitted prior to bilateral delimitation, before the CLCS will be able to make a technical appraisal of the claim in accordance with Article 76. It does not stop the coastal states concerned submitting their claims to the Commission, which will stop the 10 year deadline, but the claim will not be studied until the coastal states concerned either agree that the Commission should study the claim, or if the overlapping claims have been settled.

An illustration of this type of situation is in Figure 32 This illustrates the overlapping continental shelf claims beyond 200nm in the Northeast Atlantic. Although the United Kingdom and the Republic of Ireland have agreed their continental shelf boundary in this area[86] there remain overlapping claims by Iceland and Denmark on behalf of the Faeroe Islands, which will have to be settled before the various claims can be studied by the CLCS.[87]

5.3 Publicising the Limits of Maritime Zones

Under Articles 75 and 84 of UNCLOS, coastal states are required to show the outer limit lines of their EEZ and continental shelf, along with any delimitation lines on charts of a scale (or scales) adequate for ascertaining their position. Where appropriate, lists of geographical coordinates (specifying the geodetic datum to which the coordinates refer) may be used instead. A similar rule applies for straight and archipelagic baselines (Articles 16 and 47). In all cases the coastal state is required to give due publicity to the relevant charts or lists of coordinates and to deposit a copy of each document with the Secretary-General of the United Nations.

83 UN Document CLCS/L.3.

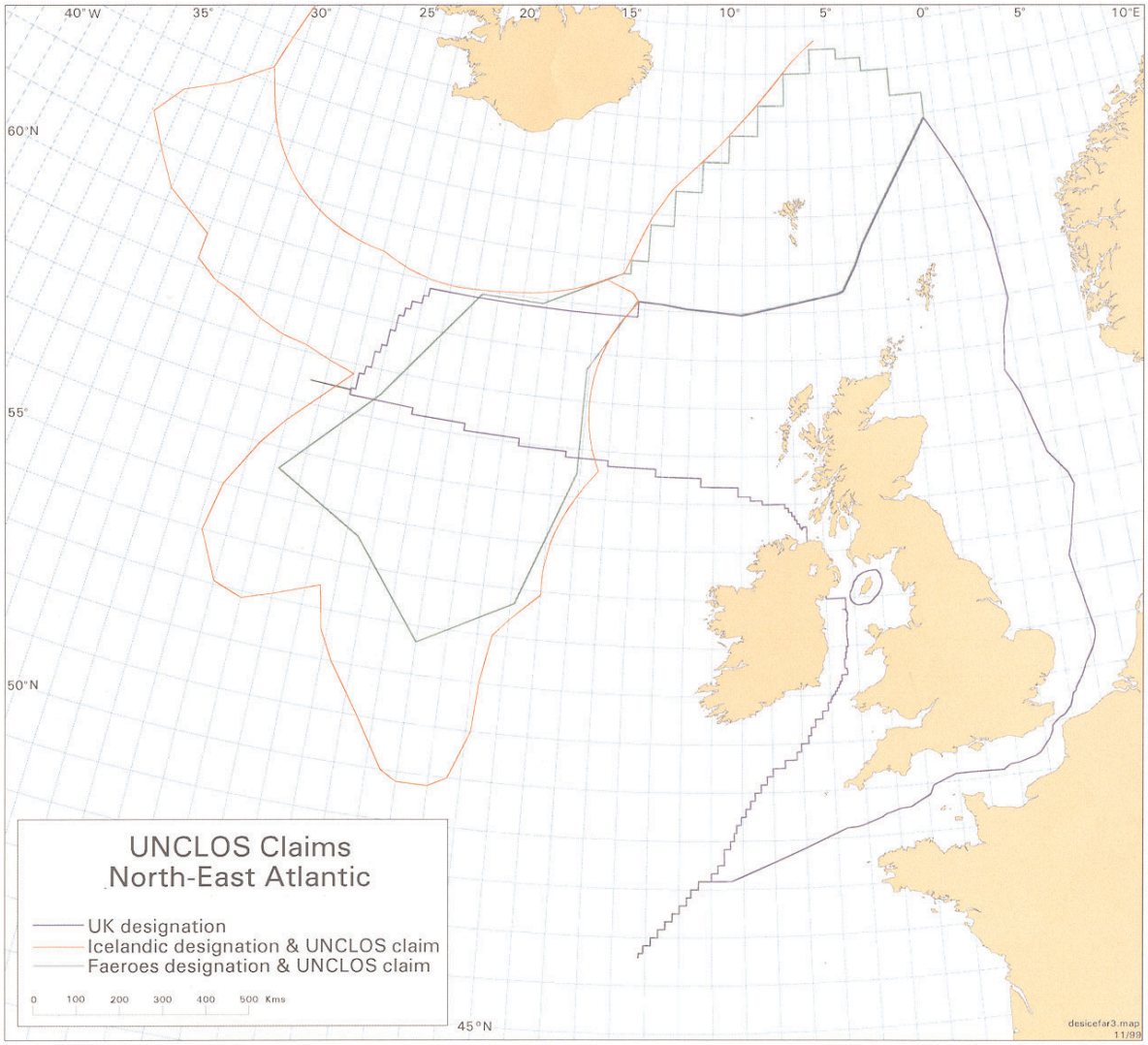
84 UN Document CLCS/3/Rev.2.

85 UN Documents CLCS/11, CLCS/11/Add.1, CLCS/11/add.1/Corr.1.

86 *Agreement between the Government of the United Kingdom of Great Britain and Northern Ireland and the Government of the Republic of Ireland concerning the Delimitation ofAreas of the Continental Shelf between the two Countries*, Treaty Series No. 20 (1990), Cm 990, London: HMSO.

87 See Cook and Carleton, 2000.

Figure 32: Competing Continental Shelf Claims in the Northeast Atlantic



5. Conclusions

Of the 135 States that are parties to UNCLOS, 120 are coastal. Of these a considerable number have little knowledge of their maritime zones and boundaries and it is certainly the case that the majority of potential maritime boundaries around the world remain undelimited. There is therefore a great deal of work required to bring this situation to a satisfactory conclusion.

The technical expertise that is required to determine and to delimit a coastal State's maritime space is both varied in scope and innovative in its development. There is still a requirement to understand the use that can be made from nautical charts, whether they be paper, raster or vector products. Knowledge is also required of the use of alternative means of studying the coastline such as aerial photography and satellite imagery and other forms of remote sensing.

The relevance of geodesy in the determination of maritime space, particularly a thorough understanding of geodetic datums, both horizontal and vertical, is perhaps even more important today than it was 35 years ago. The use of accurate navigational positioning systems such as the Global Positioning System (GPS) allows practitioners to determine their positions

on the Earth's surface to within a few metres. It is therefore incumbent upon the technical expert to attempt to match or even better this accuracy when determining the limit of a coastal State's maritime space. Without a sound understanding and appreciation of geodesy, he/she will be unable to achieve this goal.

It is important to realise that the technical expert has a role in the drafting of maritime zone legislation. Many States have not updated their legislation to bring it into line with UNCLOS or have not amended legislation defining the territorial sea baseline, including straight baseline systems, to reflect changes in the coastline.

The correct determination of the territorial sea baseline is perhaps the most important fundamental task that the technical expert is required to carry out. It is not easy, requiring an in depth knowledge of the coastline, bay closing lines and straight baseline systems. If relevant an intimate knowledge of Part IV of UNCLOS covering the provisions for archipelagic States will also be required. It is very much the responsibility of the technical expert to advise the legal and political elements in the government administration on the correct technical interpretation of the provision for bay closing lines and more especially straight baselines to attempt to reduce the misuse of Article 7 of the Convention.

Once the territorial sea baseline has been determined in accordance with the Convention, the generation of the various maritime zones using modern computer technology is a relatively straight-forward task. The one maritime zone that is continuing to tax the brightest technical and legal experts is the determination of the outer limit of the continental shelf beyond 200nm in accordance with Article 76 even with the assistance of the Technical Guidelines of the Commission on the Limits of the Continental Shelf.

Once the various maritime zones have been determined the need for maritime delimitation, if not already carried out, will become apparent. The technical expert has a major role to play in any maritime boundary negotiation team being one of the legs of the core triumvirate of 'legal, political and technical' disciplines that should make up the team. These issues will be considered in a companion *Briefing* to this one.

The technical challenges involved in the determination of maritime space, whether they be zones or boundaries are considerable. As States increasingly realise the potential wealth of the maritime domain and seek to exploit it, the expertise and innovation of the technical expert will be tested to the limit for decades to come so long as mankind still favours the concept of the territorial sovereignty of the nation state.

Appendix 1: List of Ellipsoids

ELLIPSOIDS	MAJOR SEMI AXIS	1 / FLATTENING
AIG 1976	6378140.	298.257
AIRY 1830 HOTINE (see AIRY 1848)		
AIRY 1848	6377563.3963	299.3249646
AIRY 1924 WAR OFFICE		
AIRY MODIFIED	6377340.1891	299.3249646
AIRY – US	6377542.178	299.325
APL MK 4.5	6378137.	298.25
APL NAVIGATION	6378144.	298.23
APL 5.0 6378140.	298.26	
APL – OMA	6378165.953	298.3
AUSTRALIA 165	6378165.	298.3
AUSTRALIAN NATIONAL	6378160.	298.25
BESSEL 1841	6377397.155	299.1528128
BESSEL FM 1841	6377397.155	299.152813
BESSEL NORWAY	6377492.018	299.1528
BESSEL US	6377397.2	299.15
BESSEL 1841 PORTUGAL	6377397.155	299.1528
CLARKE 1858	6378293.645	294.26
CLARKE 1866	6378206.4	294.9786982
CLARKE 1866 MICHIGAN	6378450.047	294.978698
CLARKE 1880 ENGLAND	6378249.1453	293.456
CLARKE 1880 IGN	6378249.2	293.466021
CLARKE 1880 MODIFIED	6378249.1388	293.466308
CLARKE 1880 PALESTINE	6378300.7893	293.466307
CLARKE 1880 FIJI		
DANISH	6377104.43	300.
DENMARK	6377019.26	300.
DELAMBRE 1810 – CARTE DE FRANCE	6376985.	308.64
DGFI 1986	6378144.11	298.257
DGFI 1987	6378136.	298.257
DU PLESSIS “RECONSTITUTE” AMS 1944	6379523.994	
EVEREST 1830	6377276.3452	300.8017
EVEREST BARI	6377301.2435	300.801725
EVEREST BORNEO	6377298.556	300.8017
FISCHER 1955	6378155.	298.3
GERMAIN	6378284.	294.28
GEM – NASA	6378155.	298.255
GHANA NATIONAL	6378295.	296.004037
GSFC 145	6378145.	298.255
GSFC 138	6378138.	298.255
HAYFORD 1909 (see HAYFORD INTERNATIONAL)		
HAYFORD (INTERNATIONAL)	6378388.	297.
HEISKANEN 1929	6378400.	298.2
HELMERT 1907 (1906)	6378200.	298.3
HOLLONDAIS	6376850.	309.6
HOUGH	6378270.	297.
IAG GRS 1976	6378160.	298.247167
IAG GRS 1980	6378137	298.257222
INTERNATIONAL 1924		
JEFFREYS 1948	6378099.	297.1
JMR SP3 1976		
KRASSOWSKY URSS	6378245.	298.3
MALAYAN (EVEREST MODIFIED)	6377304.063	300.8017

ELLIPSOIDS	**MAJOR SEMI AXIS**	**1 / FLATTENING**
MERCURY 1960	6378166.	298.3
MECURY MODIFIED 1968	6378150.	298.3
NASA 6378148	298.3	
NASA – GEN9	6378140.	298.255
NASA – GEN10B	6378138.	298.257
NWL 8E		
PLESSIS 6376523	308.64	
POIDS – MESURES 1799	6375739.	334.29
REFERENCE 1867		
SAO SE – 1	6378165.	298.25
SAO SE – 3	6378140.	298.256
SOUTH AMERICAN 1969	6378160.	298.25
STRUVE ESPAGNE	6378298.3	294.729991
SVANBERG SUEDE	6376797.	304.2506
UAI 1964	6378160.	298.25
UTEX 6378137	298.225	
WALBECK URSS	6376895.	302.782157
WGS 1960	6378165.	298.3
WGS 1966	6378145.	298.25
WGS 1972	6378135.	298.26
WGS 1984	6378137.	298.257223563

Appendix 2

National Claims to Maritime Jurisdiction Admiralty Notice to Mariners No. 12

3246 NATIONAL CLAIMS TO MARITIME JURISDICTION.

Former Notice12/01 is cancelled.

The following list shows the breadth of sea (measured from the appropriate baselines) claimed respectively as territorial sea (TS), contiguous zone (CZ), exclusive economic zone (EEZ) and fishery zone (FZ), where no EEZ is claimed, as being under the state's jurisdiction. The information is compiled from various, sometimes unofficial sources, the absence of a limit from this list indicates that the information is not held.

The claims are published for information only. Her Majesty's Government does not recognise claims to territorial seas exceeding twelve nautical miles, to contiguous zones exceeding twenty four nautical miles or to exclusive economic zones and fisheries zones exceeding two hundred nautical miles.

Country	*TS*	*CZ*	*EEZ*	*FZ*
Albania[1]	12[**]	—	—	12
Algeria[1*]	12[**]	—	—	52[22]
Angola[1*]	12	24	200	—
Antigua and Barbuda[2*]	12[**]	24	200	—
Argentina[1*]	12	24	200	—
Australia[1*]	12[11]	24	200	—
Australian Antarctica	12	—	—	12
Bahamas[2*]	12	—	200	—
Bahrain[*]	12	24	—	—
Bangladesh[4]	12[**]	18	200	—
Barbados[*]	12[**]	—	200	—
Belgium[*]	12	—	200	—
Belize[1*]	12[16]	—	200	—
Benin[*]	200	—	—	200
Brazil[*1]	12[**]	24	200	—
Brunei[*]	12	—	200	—
Bulgaria[*]	12[**]	24	200	—
Burma[1*]	12[**]	24	200	—
Cambodia[1]	12[**]	24	200	—
Cameroon[1*]	50	—	—	—
Canada [1]	12	24	200	—
Cape Verde Islands[2*]	12	24	200	—
Chile[1*]	12	24	200	—
China				
PRC[1*]	12[**]	24	200	—
ROC (Taiwan)[1]	12	24	—	200
Colombia[1]	12	—	200	—
Comoros[2*]	12	—	200	—
Congo				
Brazzaville	200[**]	—	—	200
Kinshasa* (Zaire)	12	—	200	—
Cook Islands[*]	12	—	200	—
Costa Rica[*]	12	—	200	—
Croatia[1*]	12[**]	—	200	—

Cuba[1*]	12	24	200	—
Cyprus[*]	12	—	—	12
Denmark[1]	12[**]	—	200	—
Greenland[1]	3	—	—	200
Færoe Islands[1]	3	—	—	200
Djibouti [1*]	12	24	200	—
Dominica[*]	12	24	200	—
Dominican Republic[1]	6	24	200	—
Ecuador[1]	200	—	—	200
Egypt[1*]	12[**]	24	200	—
El Salvador	200	—	—	200
Equatorial Guinea[*]	12	—	200	—
Eritrea[1]	12[12]	—	—	—
Estonia	12[**20]	—	200	—
Federated States of Micronesia[*]	12	—	200	—
Fiji[2*]	12	24	200	—
Finland[1*]	12[**13 20]	14	—	12[21]
France[1*]	12	24	200[14]	12[14]
French Antarctica	12	—	—	—
Gabon [1,*]	12	24	200	—
Gambia[*]	12	18	200	—
Georgia[*]	12	—	200	—
Germany[1, 9*]	12	—	200	—
Ghana[*]	12	24	200	—
Greece[*]	6	—	—	6
Grenada[*]	12[**]	—	200	—
Guatemala[*]	12	—	200	—
Guinea[*]	12	—	200	—
Guinea Bissau[1*]	12	—	200	—
Guyana[*]	12[**]	—	200	—
Haiti[*]	12	24	200	—
Honduras [1*]	12	24	200	—
Iceland[1*]	12	—	200	—
India[*]	12[**]	24	200	—
Indonesia[2*]	12	24	200	—
Iran[1]	12[**]	24	200	—
Iraq[*]	12	—	—	—
Irish Republic[1*]	12	—	—	200
Israel	12[17]	—	—	—
Italy[1*]	12	—	—	12
Ivory Coast[*]	12	—	200	—
Jamaica[2*]	12	24	200	—
Japan[1*]	12[23]	24	200	—
Jordan[*]	3	—	—	3
Kenya[1*]	12	—	200	—
Kiribati[2]	12	—	200	—
Korea (North)	12[**]	—	200	—
Korea (South)[1*]	12[6**]	24	200	—
Kuwait[*]	12	—	—	—

Latvia	12	—	200	—
Lebanon[*]	12	—	—	—
Liberia	200	—	—	200
Libya[5]	12[**]	—	—	20
Lithuania	12	—	200	—
Madagascar[1]	12	24	200	—
Malaysia[1*]	12	—	200	—
Maldives[2*]	12[**]	24	200	—
Malta[1*]	12[**]	24	—	25
Marshall Islands[2*]	12	24	200	—
Mauritania[1*]	12	24	200	—
Mauritius[1*]	12[**]	—	200	—
Mexico[1*]	12	24	200	—
Monaco[3*]	12	—	—	12
Morocco[1]	12	24	200	—
Mozambique[1*]	12	—	200	—
Namibia[*]	12	24	200	—
Nauru[*]	12	24	200	–
Netherlands[1*]	12	—	200	–
Netherlands Antilles	12	—	—	to median lines
Aruba	12	—	—	to median lines
New Zealand[*]	12	—	200	—
Ross Dependency	12	—	—	—
Nicaragua[*]	200[**]	—	—	200
Nigeria[*]	12[**]	—	200	—
Norway[1*]	4	10	200	—
Svalbard[1]	4	—	—	200
Oman[1*]	12	24	200	—
Pakistan[1*]	12[**]	24	200	—
Palau (Belau)[*]	3	–	–	200
Panama[*]	12	24	200	—
Papua New Guinea[2*]	12[15]	—	—	200
Peru	200	—	—	200
Philippines[2, 3*]	12	—	200	—
Poland[*]	12[**]	—	200	—
Portugal[1*]	12	24	200	—
Qatar	12	24	—	to median lines
Romania[1*]	12[**]	24	200	—
Russia[1*]	12	—	200	—
St. Kitts-Nevis[*]	12	24	200	—
St. Lucia[*]	12	24	200	—
St. Vincent and the Grenadines[2*]	12[**]	24	200	—
Sao Tome and Principe[2*]	12	—	200	—
Saudi Arabia[1*]	12	18	—	—
Senegal[1*]	12	24	200	—
Seychelles[*]	12	24	200	—
Sierra Leone[*]	200	—	—	200
Singapore[*]	3	—	—	3[24]
Slovenia[*]	12	—	—	—
Solomon Islands[2*]	12	—	200	—
Somalia[*]	200[**]	—	—	200

South Africa[1*]	12	24	200	—
Spain[1*]	12	24	200[14]	to median lines[14]
Sri Lanka[*]	12[**]	24	200	—
Sudan[1*]	12[**]	18	—	—
Surinam[*]	12	—	200	—
Sweden[1*]	12	—	200	—
Syria	35[**]	41	—	—
Tanzania[*]	12	—	200	—
Thailand[1]	12	—	200	—
Togo[*]	30	—	200	—
Tonga[3 *]	12[3]	—	200[3]	—
Trinidad and Tobago[2*]	12	24	200	—
Tunisia[1*]	12	24	—	12[8]
Turkey[1]	12[7**]	—	200[18]	12[7]
Tuvalu[2]	12	24	200	—
UAE[1]	12[**]	24	200	—
UK[1*]	12	—	—	200
Anguilla[*]	3	—	—	200
Bailiwick of Guernsey[*]	3	—	—	12
Bailiwick of Jersey[*]	12	—	—	3
Bermuda[*]	12	—	200	—
British Antarctic Territory[*]	3	—	—	3
British Indian Ocean Territory[*]	3	—	—	200
British Virgin Islands[*]	3	—	—	200
Cayman Islands[*]	12	—	—	200
Cyprus (Sovereign Base Areas)	3	—	—	3
Falkland Islands[1*]	12	—	—	200[10]
Gibraltar[*]	3	—	—	3
Isle of Man[*]	12	—	—	12
Montserrat[*]	3	—	—	200
Pitcairn[*]	3	—	200	—
St. Helena and Dependencies[*]	12	—	—	200
South Georgia[1*]	12	—	200	—
South Sandwich Islands[*]	12	—	200	—
Turks and Caicos Islands[1*]	12	—	—	200
Ukraine[1*]	12	—	200	—
Uruguay[1*]	12	24	200	–
USA	12	24	200	—
Vanuatu[2*]	12	24	200	—
Venezuela[1]	12	15	200	—
Vietnam[1*]	12[**]	24	200	—
Western Samoa[*]	12	—	200	—
Yemen[*]	12[**]	24	200	—
Yugoslavia[1, 19*]	12	—	—	12

Limits of dependent territories have not been listed unless they differ from those of the metropolitan state.

[1] employs straight baseline systems along all or a part of the coast.

[2] claims archipelago status.

[3] claims waters within limits defined by geographic co-ordinates not related to distance from the coastline.

[4] claims straight baseline system between points along the 18 metre isobath.
[5] claims all water south of 32° 30′N. in the Gulf of Sirte as internal waters.
[6] claims 3 M in Korea Strait.
[7] claims 6 M in Aegean Sea.
[8] fishery limit extends to 50 metre isobath off the Gulf of Gabes.
[9] special claim extends limit to include the deep water anchorage west of Helgoland.
[10] 150 M in west with a rhumb line between 52° 30′.00S, 63°19′.25W and 54° 08′.68S, 60° 00′.00W.
[11] certain islands in the Torres Strait retain 3 M territorial sea limit.
[12] jurisdiction claimed to the limit of the pearl and sedentary fishery grounds.
[13] Bogskar has a 3 M territorial sea limit.
[14] does not claim an EEZ in the Mediterranean, France only claims a 12 M fishery limit and Spain a fishery limit to median lines.
[15] reduced to 3 M in the Torres Strait area.
[16] reduced to 3 M in the Gulf of Honduras.
[17] reduced to 3 M off Gaza.
[18] only claims an EEZ in the Black Sea.
[19] Republic of Serbia and Montenegro.
[20] TS limit reduced in parts of the Gulf of Finland to preserve a 6 M wide high seas corridor.
[21] to maritime boundaries in areas exceeding 12 M.
[22] reduced to 32 M west of the longitude of Ras Térés.
[23] TS limits reduced in the following international straits to retain a high seas corridor: La Perouse (Soya), Tsugaru, Osumi, Eastern and Western Channels, and Tsushima.
[24] and beyond TS limits to treaty limits.

[*] indicates a state which has ratified or acceded to the UN Convention on the Lawof the Sea (UNCLOS), which came into force on 16 November 1994.

[**] indicates a state which requires prior permission or notification for entry of foreign warships into the territorial sea. The United Kingdom government does not recognise this requirement.

Source: UK Hydrographic Office (HH. 085/012/01).

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