

MARITIME BOUNDARIES

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A brief historical background to maritime boundary delimitation; the effect of the introduction of maritime zones of jurisdiction extending to considerable distances offshore, and the development of the principles governing modern offshore boundary determination; a discussion of some of the theoretical and practical problems that have arisen.

INTRODUCTION

Until offshore oil exploitation started about 40 years ago maritime boundaries if defined at all did not extend more than a few miles offshore. Even when the need for more extensive boundaries was appreciated, their definition was conditioned by the relative inaccuracy of offshore positioning methods, and frequently by a lack of any common geodetic datums – or even any comprehensive geodetic data of any sort.

A more exact approach to the problem became necessary with the possibility of offshore discoveries in the North Sea, ringed as it is by developed states with well established geodetic systems. This has been given further impetus by the development of doppler satellite positioning with its high order of accuracy independent of observational connections to land stations.

Although boundary disputes are as old as history, a particular feature of modern offshore boundaries is that they may often extend seaward for considerable but indefinite distances, with their direction dependent entirely upon coastal

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features. Small variations in direction may then re-apportion very large areas of resource zone (continental shelf, fisheries, etc.) and so give rise to disputes which might not happen if the extent of the boundary was more restricted. This has called into question the legal basis for determining such boundaries.

BACKGROUND

The prime requirement for any boundary settlement must be agreement between the parties concerned. In the case of maritime boundaries, however, there has been a general preference for the mid-line between the shores of the two states as the basis on which an agreed boundary can best be determined. This principle derived from that of the thalweg (or mid-channel line) as applied to river boundaries. FULTON quotes an ancient example from a charter granted by King Cnut in 1023 [1]. But it does not seem likely that boundaries based on that principle were ever a rigid geometrical mid-line such as would result from the construction of a true equidistance line between the low-water marks of the respective states.

The writer has found no references to any formulation of a geometric rule earlier than the Report of the Committee of Experts to the International Law Commission in 1953 [2]. The Committee was asked: "How should the international boundary be drawn between two countries, the coasts of which are opposite each other at a distance of less than 2 T miles?" (T being the breadth of the territorial sea, whatever that might be). To which the Committee replied: "An international boundary between countries the coasts of which are opposite each other at a distance of less than 2 T miles should as a general rule be the median line, every point of which is equidistant from the baselines of the states concerned" [3]. The Committee proposed a similar solution for the lateral boundary through the territorial sea. Although the articles in which this rule finally appeared [4] had considerably qualified the conditions under which it should be applied, the geometric principles remained unaltered. The principle was also adopted for the determination of continental shelf boundaries [5].

The framework within which the geometric rule is contained differs slightly between the Continental Shelf Convention and the Territorial Sea Convention on the question of whether the equidistant line is to be the boundary in the absence of agreement (Continental Shelf) or is to be the limit beyond which a state may not claim in the absence of agreement (Territorial Sea). In either case, however, the guiding principle is that the states should determine their common boundaries by agreement. The equidistant line is called into play in the absence of agreement, and only then where another line is not justified by special circumstances or – in the territorial sea – historic title.

DEVELOPMENT OF THE LAW

In 1966, following a breakdown of the negotiations between the Federal Republic of Germany on one hand, and the Netherlands and Denmark on the other, over their respective common continental shelf boundaries in the North Sea, the Netherlands and Denmark agreed on the basis of equidistance that they had a common boundary across that part of the shelf lying outside the area which would belong to Germany if her boundaries were also determined on strict equidistance principles. This bilateral agreement had the effect of limiting the seaward extent of the Federal Republic's continental shelf. Both Denmark and the Netherlands also claimed that their boundaries with the Federal Republic should be equidistance lines. The Federal Republic was not a party to the 1958 Convention, but the other two states were.

The case was taken to the International Court of Justice. The resulting judgement [6] is of interest in the context of this paper in that :

- (a) it reaffirmed that it was incumbent on parties to enter into genuine negotiations to agree a boundary and that to negotiate on the basis that the equidistance line was the only possible boundary was no negotiation;
- (b) it declared that the provisions of the Convention concerning the application of the equidistance line was not binding on states which are not parties to the Convention;
- (c) it suggested some factors that should be taken into account by states when negotiating a boundary settlement in accordance with equitable principles, such as : the general configuration of the coasts as well as any special or unusual features, the physical and geological structure, the natural resources, and the element of a reasonable degree of proportionality that should be brought about between the extent of the shelf appertaining to the states concerned and the lengths of their respective coastlines, measured according to their general direction.

Most continental shelf negotiations are undertaken before resource exploration has reached the stage of determining the extent - or often even the existence - of any deposits. In the particular case of the three countries, however, the boundaries were agreed in a manner that did not affect resource fields previously claimed by the Dutch and the Danes. The delimitation finally agreed also resulted in a ratio of shelf to coastline length similar to that claimed by the Federal Republic.

At the Third U.N. Law of the Sea Conference there has been general agreement that the 1958 text on delimitation of territorial sea boundaries is acceptable, but there has been a sharp divide over a text for continental shelf boundaries (and, incidentally, boundaries between the proposed Exclusive Economic Zones) between states which would like the 1958 text retained and those which wish to see the equidistance line, if referred to at all, referred to as only one method that may be employed. In the view of the latter the first requirement should be that the boundary is determined in accordance with equitable principles. It is interesting in the light of this division of

opinion to note that in the U.K.-France Continental Shelf Arbitration [7] the Court determined on an equitable solution not by rejecting the use of the equidistance (or "median") line but by giving only partial effect to the Scilly Isles as basepoints from which to determine it. Many states feel that a firm interim rule is necessary where agreement cannot be reached. If an interim rule of this kind is sought, the median line provides the most obvious solution.

In fact, State practice in continental shelf boundary agreements over the past 40 years has shown that the equidistance principle has been used in over 70 % of agreements as the basis from which to work, but that the effect of, in particular, islands may be modified either by ignoring them in determining the median line, or by awarding only a limited area of specified distance around them [8] (the enclaving method), or by giving the islands only partial effect. Almost all the agreements that are not based on equidistance concern adjacent rather than opposite states.

TECHNIQUES – DEFINITION

Land boundaries, even in areas that are not well surveyed, can be related to natural visible features like rivers or mountain peaks, or to artificial features especially erected for the purpose if necessary. In fact they are not always so related but the general statement holds good. Near-shore boundaries can be similarly related to specific topographical features by lines of bearing or of transit. But such topographical features are not themselves on or part of the boundary, except in the relatively few cases where special beacons have been erected, and therefore in that sense do not mark the course of the boundary. Further offshore, of course, such a reference to visible topographical features on land is of no benefit, and since submarine monumenting is not a practical proposition the boundary has to be defined in relation to a chart or to a co-ordinate system.

The thalweg boundary changes as the course of the river changes. Similarly some near-shore boundaries that have been related only to a distance from the low-water line must either change as the low-water line changes or must be defined in less ambulatory terms. In early near-shore boundary agreements where fixed landmarks were used for the definition, time has often erased the features so that it is difficult to reconstruct the boundary with any accuracy.

The 1958 Continental Shelf Convention required that the boundary be defined with reference to charts and geographical features as they exist at a particular date, and reference should be made to fixed permanently identifiable points on land [9]. At that time it seems that neither lawyers nor boundary experts had expected that operations would move so far offshore as they have done.

When the North Sea boundaries were negotiated in 1964 and 1965 it was clear to all that these provisions would have to be interpreted in a wider sense than the drafters probably envisaged. After all, in the case of U.K. the nearest the equidistance line came to the shore was a little less than 40 miles from the low-

lying Suffolk coast. The furthest point was over 160 miles from shore. Luckily there was a common geodetic datum available in the form of European Datum, so that it was decided to define the boundaries by geographical co-ordinates stated to be on ED (1950). It can be argued that, at least so far as established triangulation stations can be accurately related to that datum, the requirement with regard to "fixed permanently identifiable points on land" has been satisfied without, incidentally, incurring the disadvantages experienced with earlier descriptions. Until that time, of course, since it had generally been sufficient to define the boundary either by a line drawn on a chart or by lines of bearings over relatively short distances, and since great precision had been of little moment when the methods of offshore positioning were relatively inaccurate, the nature of the "straight lines" defining the boundary had never been considered. But once stretches of "straight lines" joining co-ordinated points as much as ninety miles apart were to be used, it was important to define their nature. Even so, at that time the possibility of being able to determine positions so far offshore to an absolute accuracy of a metre or so was not foreseen. Such positioning was still seen in navigational rather than geodetic terms, and so in the U.K. North Sea agreements the lines were defined as arcs of great circles between the specified co-ordinates of the turning points.

It is digressing to mention that some commentators have suggested that it is impossible to compute or determine intermediate points on a great circle in such circumstances because the co-ordinates are specified in relation to a spheroid and not to a sphere. Whilst this produces a geodetic contradiction, in practice it is workable if not ideal. Geometrically each segment of line can be considered as an isolated arc of a circle joining two points defined by co-ordinates expressed in angular measure. The angular distance between them, and the co-ordinates at any given angular interval along the arc, will be the same regardless of the radius of the circle. The course of the arc can be defined by an infinite number of such co-ordinated points. So far as the actual boundary is concerned, each of those intermediate points will be co-ordinates of latitude and longitude on the specified geodetic datum.

The extent to which precision is necessary in the definition of a line depends on the nature of the regime being delimited. In the case of a limit of fisheries jurisdiction high order navigational accuracies may suffice, but in continental shelf delimitations, particularly where there may be cross-boundary hydrocarbon fields, a higher order of precision is desirable. It is therefore surprising that a large number of continental shelf boundaries have been defined by lines joining geographical co-ordinates without reference to any particular geodetic datum, with "straight lines" of undefined nature but of considerable length, or simply by lines drawn on relatively small-scale charts. One hopes that these will not give rise to disputes in the future.

The Informal Composite Negotiating Text under discussion at the Third U.N. Law of the Sea Conference has recognized the new developments, and requires that all maritime boundaries (i.e. territorial sea, EEZ or continental shelf) shall be shown on charts of a scale or scales adequate for determining them, or alternatively that they shall be defined by a list of co-ordinates, and that the geodetic datum shall be specified [10].

So far as the nature of the lines is concerned the charting requirement needs no amplification, since the enforcing authority (i.e. the coastal state) cannot enforce the limits to a precision greater than is obtainable from the chart. Perhaps one should assume that if a list of co-ordinates is given on a specified geodetic datum the likelihood is that the nature of the lines would be defined also. I am sure that that would be over-optimistic, but I recognize that in practice it would be difficult to get greater technical detail written into a general Convention of the type being negotiated.

DETERMINATION

Once a boundary has been defined the positions must be considered to be precise, no matter to how few or to how many places of decimals positions may have been quoted. But it clearly cannot be assumed that where a boundary is defined to, say, 1/100th of a second of arc (approx. ± 0.15 metres) it was necessarily determined to a similar accuracy.

Traditionally, of course, maritime boundaries have been plotted directly on a chart. In the case of territorial sea boundaries this could often be of a large scale and the resulting boundary would be determined to as great an accuracy as it was possible to determine the coastline to which it was probably related. The choice of chart projection was unlikely to make any plottable difference. In fact a special protractor engraved with closely spaced concentric circles could be used as a quick and accurate method of plotting an equidistance line.

When it became necessary to determine boundaries well offshore, it was no longer possible to use large-scale charts. If equidistant lines were to be determined by plotting, a rather more tedious procedure had to be adopted. First the line had to be determined approximately from small scale charts, and from that the general locality of relevant controlling basepoints could be determined. The co-ordinates of the basepoint feature had then to be obtained from the large scale chart and transferred to an appropriate smaller scale on which the final line could be plotted.

At this stage the question of chart projection became important. Where a line runs more or less east and west, the controlling basepoints on the respective shores are likely to lie roughly along the same respective parallels. If there is a nautical chart of a suitable scale it may be feasible to use it, making appropriate allowances for the scale factor of the Mercator projection widely used for this type of chart. Where, as in the North Sea, the line is nearly north-south, the controlling basepoints and the relevant equidistant point may all be at significantly different latitudes. This makes it difficult to apply suitable scale corrections when plotting. The only practicable procedure is to construct a plotting sheet on a suitable scale and using a more suitable projection.

To cover the necessary area to embrace the appropriate basepoints, even if the line is constructed in sections, means that the scale is necessarily quite small. In the North Sea a scale of 1:500 000 was used. The resulting positions cannot

be plotted or read off to an accuracy better than 6 seconds of arc. In fact you may have noticed that the positions in the 1965 North Sea agreements are all in multiples of six seconds.

Now, of course, computers have revolutionized procedures. Given discrete basepoint positions, a series of equidistant points can be computed on the spheroid of choice even using small programmable calculators. Even with these computers, accuracies to a 100th of a second of arc can be achieved. Where one coastal state's baselines are discrete points along a sinuous coast, and the other state's are a series of straight baselines, the computation becomes more difficult. Programs for large computers have been devised that will automatically select the nearest basepoints along digitized coastlines and compute the equidistant line. Similar programs have been devised for use with straight baselines, although once again these are more complicated.

Of course the ability to compute a line to a high order of definition does not make its positioning *as an equidistant line* any more accurate than the basepoints on which it depends. In most, if not all, cases these will depend on the accuracy of the charting or mapping of the low-water line. In the best cases this is not likely to be better than ± 20 metres, and in most cases will be considerably worse. It does not follow, however, that computing the equidistant line to a higher order of definition is not necessary: boundary negotiators would not find their task any easier if they were given a theoretical line that could only be agreed to, say, ± 50 metres.

THE TREATY LINE

Whilst the equidistant line may be a very good basis from which to work to a boundary, it is seldom suitable as an offshore boundary in itself. Leaving aside the question of whether it is an equidistant line between territorial sea baselines or some other baselines arbitrarily chosen to compensate for some particular conditions, the line is generally much too complex and with far too many turning points to be suitable for definition in a treaty, or for administration in practice. In almost every case of which I know the line has been simplified for treaty purposes. Indeed the very first continental shelf boundary ever negotiated, between Venezuela and Trinidad in the Gulf of Paria [11], is a single straight line which exactly balances the areas between it and the true equidistant line, so that each country loses and gains the same surface area. This technique of area compensation, although not usually on such a sweeping scale as that, is an accepted way of simplifying a line, but it is usual to let the agreed boundary reflect the general trends of the equidistant line. Another method that has been used is to take a mean direction rather than a mean of the areas. The method adopted will usually reflect the extent to which hydrocarbon or other economically important deposits are thought to exist near the boundary.

PRACTICAL PROBLEMS

Whilst it is obvious that use of a common geodetic datum is highly desirable for boundary agreements, there are many areas of the world, particularly where demarcation between oceanic islands is involved, where there is no common geodetic datum. Furthermore, the need to establish boundaries may be urgent. In these circumstances it seems best to try to agree on a datum – probably a World System – which is likely to be achievable in the future. The boundary initially should be determined using the best available geodetic positions, and if any can be translated to the agreed datum the translation should be used. It may well be that if the boundary is mainly for fishery purposes – as many EEZ boundaries in such areas will be – the errors discovered, when all basepoints are established on the chosen datum, will not be large enough to merit any change in the agreement. Meanwhile the boundary as defined can be located by, for instance, doppler satellite techniques even if all the basepoints are not accurately located.

In fact, errors of a similar magnitude may arise from lack of up-to-date charted detail from which accurately to determine the basepoint positions. Where the charts are based on very old surveys it may be better to use maps incorporating modern land surveys, if they exist, for the purposes of boundary determination. In some cases the geographical relationships and topography shown on the modern land map may be correct whilst the chart based on old surveys is still likely to be best evidence for the status and extent of the water features like low-tide elevation. It must be emphasized, however, that use of the land map in such circumstances is an expedient which must have the agreement of the parties concerned. For one thing, the vertical datum used by land surveyors frequently differs significantly from that used by hydrographic surveyors for nautical charting. International law, for good practical reasons, requires that the normal baseline shall be the low-water line as shown on large-scale charts.

The need for an agreed geodetic datum and a precisely defined boundary becomes particularly apparent when a hydrocarbon deposit straddles the boundary. This, of course, happens in the North Sea, and it has been necessary to make very careful doppler satellite observations at platforms near the boundary to establish their exact relation to it, and so to agree the division of revenue from the oil extracted.

When a simplified line has been agreed in principle there may still be a difference of opinion on how the line shall be defined. The method of arcs of great circles used in the North Sea is unlikely to be followed, even though it has been used elsewhere. But there is a division of opinion between use of the loxodrome and the geodesic; the latter most nearly approximates to an equidistant line. If the agreed turning points are widely spaced and the area concerned is potentially rich in minerals, the resulting errors introduced by using the loxodrome may be significant if adjustment is not made to allow for the difference between it and the geodesic. On the other hand, if the boundary is largely concerned with fisheries jurisdiction the length of any individual segment is

unlikely to be great enough to introduce plottable differences on medium or small scale charts, however the line is defined. Many licence blocks, as in the North Sea, are bounded by meridians and parallels, both of which are loxodromes, so that in such areas an international boundary also defined by loxodromes may in certain circumstances be logical.

SEMI-LEGAL PROBLEMS

The determination of an equidistance line is straightforward enough. But it may be necessary to apply equidistance principles from modified baselines in order to arrive at an equitable result. The most common situation is opposite states of similar coastal configuration, only one of which has declared a straight baseline system. In such a case it may be necessary for the other state to use a comparable "notional" system purely for the purpose of arriving at an equitable equidistance line.

A similar problem may arise off coasts fronted by extensive areas of drying banks, where one state has declared a wider territorial sea breadth than the other. The state with the wider claim may step out a greater distance to claim more seaward banks as baselines; in which case the opposite state may have to use similar features for the purpose of arriving at an equitable line.

The treatment of islands or other features which have been considered to constitute a "special circumstance" is quite varied, and has been touched on above in the last paragraph of the section "Development of the Law". But when it has been decided to give partial effect to a feature, some care is necessary to determine just how that effect is to be achieved in practice [12]. This type of treatment may well become a feature of arbitral judgements in the future, and it will be interesting to see how practice develops.

Finally, it should be noted that the delimitation articles for the Exclusive Economic Zone - if it becomes established - and the Continental Shelf as contained in the Informal Composite Negotiating Text are identical [13]. But the EEZ itself is to be established on the basis of distance whereas the continental shelf depends upon the extent of the natural prolongation of the coastal state's land mass and may extend beyond the distance limit of the EEZ. The two criteria may well be incompatible where, for instance, the natural prolongation of one state clearly extends into what would under principles of equidistance be the EEZ of an opposite state. And it must be remembered that the EEZ would by definition include the seabed and subsoil [14]. Each delimitation requires that account be taken "of all circumstances prevailing in the area concerned" [15]. Even where such an obvious conflict does not occur, there may be difficulty in determining which interest - mineral extraction or fisheries for instance - is to be the dominant issue. Alternatively, it may be necessary to have overlapping jurisdictions of different types; for instance the 1978 Treaty between Australia and Papua New Guinea provides for a fisheries jurisdiction line in the Torres Strait that is markedly different from the continental shelf boundary.

CONCLUSION

During the past twenty years the search for hydrocarbons under the sea bed and the concept of the Exclusive Economic Zone have brought the need to define boundaries lying at considerable distances from land. This has produced problems that were not foreseen when the ground rules were devised in the 1950s. New techniques of position fixing on the ground, and the ease with which complex geodetic computations can be made, have between them made it possible to achieve accurate maritime boundary definition and retrieval. When these techniques are applied they remove the need for monumenting, supposing such a thing to be feasible. In many areas, though, the necessary data does not exist to allow of accurate boundary determination relative to the coastal states concerned, but, provided the line is adequately defined, it can still be located by modern position determination methods.

Unfortunately there is evidence that, despite the possibilities available, these techniques are often either not appreciated or are ignored. This may give rise to difficulties later.

Although boundary determination has been discussed largely on the basis of the equidistance line, the need for proper boundary definition applies equally to those determined on other principles.

The law has not stood still either, and complications have arisen in deciding on the method and principles to be employed in determining maritime boundaries. Whilst to a large extent the determination of these matters is the province of lawyers, politicians and negotiators, technical advice is necessary to ensure that the principles intended are in fact applied correctly and that the essential geographical facts are correctly presented.

Finally it is necessary to point out that the views expressed in this paper are those of the author, and do not necessarily represent those of Her Majesty's Government.

REFERENCES

- [1] Sovereignty of the Sea, 1st Edition (1911), p. 542.
- [2] UNGA Document A/CN.4/61/Add.1 of 18 May 1953.
- [3] Ibid. Annex p.6 – the full question as asked and answered also dealt with the question of the presence of islands, but the solution offered does not appear in recognizable form in the eventual 1958 Convention.
- [4] Article 12 of the 1958 Geneva Convention on the Territorial Sea and Contiguous Zone.
- [5] Article 6 of the 1958 Geneva Convention on the Continental Shelf.
- [6] North Sea Continental Shelf Cases 1969 – Judgement of 20 February 1969.
- [7] Decision of the Court of Arbitration dated 30 June 1977 – see HMSO Cmnd. 7438.
- [8] e.g. Italy-Yugoslavia (1970); Iran-Saudi Arabia (1969); Italy-Tunisia (1978).

- [9] *Op. cit.*, art. 6 (3).
- [10] *Op. cit.* Rev 2, articles 16, 75 and 83.
- [11] Signed in Caracas, 26 February 1943. HMSO Cmnd. 6400.
- [12] See for instance "Half-effect applied to equidistance lines". BEAZLEY, P.B. *Intern. Hydrog. Review*, Monaco, LV1(1), January 1979.
- [13] *Op. cit.* Rev 2, articles 74 and 83.
- [14] *Op. cit.* Rev 2, article 56 (1)(a).
- [15] *Op. cit.* para. 1.