Maritime delimitation

The equiratio method – a new approach

Wijnand Langeraar

The shortcomings and restrictions of the equidistance method of delimitation of offshore areas are outlined, as well as some mitigating procedures which have been employed in order to diminish possible deleterious effects resulting from the application of the method. As an alternative, a more versatile method has been developed, utilizing – instead of the notion of equidistance – the more general concept of equiratio, of which the equidistance method is only one, extreme, case. In the article examples have been given of negotiated offshore boundary lines and compared with what would have been possible had the equiratio method of delimitation been utilized.

Keywords: Martime boundaries; Delimitation; Equiratio method

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It is to be expected that during the remaining years of the 20th century a considerable number of potential maritime boundaries will be negotiated, ie signed or ratified. This will result from advancing marine technology penetrating the sea areas falling under the extended jurisdiction which coastal states can now claim over the water column, seabed and subsoil adjacent to their coastlines under the new Law of the Sea Convention. It has been reported that some 376 potential maritime boundaries can be recognized, about 90 of which have been negotiated, ie ± 24% of the total number.[1] Of these latter 69 (about 18%) had actually entered into force at the time (June 1982); the remaining 21 still await ratification. This implies that a few years ago about 285 potential maritime boundaries awaited the opening of *pourparlers* regarding their delineation. A few of these will have entered into the phase of negotiation since then, but many maritime area delimitations will have to be resolved before the end of this millenium.

The author has calculated that the regions principally affected are the Caribbean, in which some 65 potential maritime boundaries still remain to be delineated, the Mediterranean and Black Seas with 37 such boundaries, the south-east Atlantic Ocean with 33, the Indian Ocean and periphery with 45 and the western and central Pacific Ocean with some 43 potential maritime boundaries still unnegotiated.[2] Moreover, compared to the 1960s and early 1970s, negotiating parties during the remaining years of this century will have a tougher task arriving at a mutually acceptable boundary delineation. It is the intention of this article to provide a new and flexible tool to assist in shaping such partitioning.

Offshore area delimitation

Brown[3] in his examination of the judgment of the International Court of Justice (1982),[4] given in the case concerning the delimitation of the continental shelf between Tunisia and the Libyan Arab Jamahirija, clearly describes the uncertainty and vagueness of the rules governing delimitation of maritime areas between neighbouring states. This

[1] See R.W. Smith, 'A geographical primer to maritime boundary-making', *Ocean Development and International Law Journal*, Vol 12, No 1–2, 1982, pp 1–22.
[2] Figures calculated from data in Table 1 of Smith, *op cit*, Ref 1.
[3] See E.D. Brown The Tunisia–Libya continental shelf case', *Marine Policy*, Vol 7, No 3, July 1983, pp 142–162.
[4] International Court of Justice, *Case concerning the continental shelf (Tunisia/Libyan Arab Jamahirija)*, judgment of 24 February 1982, p 309.

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uncertainty is mainly the result of the wording of Article 74 (1) in conjunction with Article 83 (1) in the new Law of the Sea Convention, dealing with the delimitation of the exclusive economic zone and the continental shelf, respectively, between states with either opposite or adjacent coasts:

> The delimitation of the exclusive economic zone (re continental shelf in Article 83) between States with opposite or adjacent coasts shall be effected by agreement on the basis of international law, as referred to in Article 38 of the Statute of the International Court of Justice, in order to achieve an equitable solution.[5]

It is this notion of an 'equitable solution' which gives rise to subjective approaches and occasions the employment of complicated and sometimes rather arbitrary delimitation methods. It is to be noted that nowhere in the text of the LOS Convention is mention made of any particular method of delimitation. This omission is quite deliberate as in the penultimate text of the Draft Convention mention was still made of certain methods to be employed, such as the use of the median or equidistance line 'when appropriate'. This method was adopted in the 1956 Report of the International Law Commission and – as described by Beazley[6]–appeared for the first time in the United Nations General Assembly Document A/CN.4/61/Add.1 of 18 May 1953. The fact that the method is not referred to any more does not necessarily imply that it will not be utilized again. Though equidistance is far from being the panacea for all problems of partitioning, the method based on it is easy to apply and provides at least reasonable equality – if not always equity – in questions of delimitation.

Problems of equity

In Article 6 of the 1958 Convention on the Continental Shelf, as published in 1965 by the United Nations,[7] the possible use of the equidistance method was clearly foreseen. The relative imperfection of the equidistance method was not only emphasized in paragraph 101, points C (1) and D (3) of the judgment of the International Court of Justice (1969), the same text also contained a number of circumstances which could necessitate the utilization of a partitioning system different from the equidistance method in order to achieve equity.[8]

The circumstances enumerated in points C (1) and D (3), to be taken into account when equity is aimed at, were:

- the recognition of (part of) the continental shelf as constituting a natural prolongation of the land territory, of one or both of the negotiating parties, into and under the sea; and
- the observance of a reasonable degree of proportionality between the extent of the continental shelf area appertaining to the coastal state and the length of its coast measured in the general direction of the coastline.

The relative value of the notion of prolongation of the land territory into and under the sea in the pursuit of equity is emphasized in paragraph 133, point A (2) of the 1982 judgment of the International Court of Justice:

> The area relevant for the delimitation constitutes a single continental shelf as the natural prolongation of the land territory of both Parties, so that in the present

[5]See United Nations, *Draft Convention on the Law of the Sea*, conference document A/CONF.62/L.78 ddo 28 August 1981, p 175.
[6]See P.B. Beazley, 'Maritime boundaries', *International Hydrographic Review*, Vol LIX, No 1, January 1982, pp 149–159.
[7]See United Nations, *Convention on the Continental Shelf*, Geneva, 29 April 1958, Treaty Series 499, 1964, pp 312–320.
[8]Paragraph 101, points C (1) and D (3) appear in the judgment of the International Court of Justice, *North Sea Continental Shelf Cases*, judgment of 20 February 1969, p 257.

case no criterion for delimitation of shelf areas can be derived from the principle of natural prolongation as such.[9]

At the same time additional circumstances may influence the – more or less subjective – choice of a method of delimitation aiming at an equitable partitioning, for example, geographical, historical, geophysical or related characteristics such as the general configuration of the coastline, major changes in the general direction of the low-water line, the existence, size, position, habitation, etc of offshore islands, historic fishing rights and rights of third parties in the maritime area. Other circumstances may influence the notion of what is equitable with regard to size and importance of the different maritime areas to be assigned to state parties.

Mitigation of equidistance

Although the equidistance method was referred to in the 1958 Convention on the Continental Shelf, its application was not assured, as the method often did not produce a delineated boundary line in keeping with the parties' notion of equity. One reason for this undeniably disappointing result is that when an equidistance line moves away from the baseline the inequity of the partitioned areas often increases. An offshore island may occasion an increasingly inequitable portion of the continental shelf falling to it further offshore.[10]

Endeavours have been made to mitigate possible inequitable results of the equidistance method. In 1979 Beazley,[11] in his article on half-effect applied to equidistance lines, gives some examples of reducing inequitable results following strict adherence to the equidistance method of delimitation. However, the half-effect as developed by Beazley cannot be defined unambiguously. It is most effective when, for example, an offshore island exerts a disproportionate influence on the course of a boundary line. Using the half-effect method, two boundary lines are drawn, one taking the island fully into account and another drawn as if the island did not exist. The median line between these two extremes is then chosen as the (half-effect) boundary line. However, it would be difficult to find a similar half-effect result to counteract the inequitable influence of a major change of direction in the low-water line.

Now that the LOS Convention stresses equity rather than equidistance, it is to be expected that the search for equitable results will intensify and may give rise to many fine nuances to be taken account of. Because of the infinite number of possible approaches to achieving a degree of mutually acceptable equity it would, therefore, be desirable to have a methodology of delimitation that allows of a well-nigh continuous adaptation to the great number of demands that may be made thereon.

It is this author's view that the equidistance method – whether or not moderated by half-effect or partial-effect measures – does not possess the necessary adaptability to satisfy the diverging requirements which emerge in actual practice. Langeraar[12] suggests replacing the parabolic equidistance boundary line between an island state and a continental one by an elliptic curve. As this (part of an) ellipse can be given different dimensions and as these dimensions are directly functionally related to the ratio agreed upon, this approach is more flexible than the equidistance method of delimitation and, therefore, can better counter

[9]See the judgment of the International Court of Justice, *op cit*, Ref 4.
[10]See Figure 3–30 on p 512 of W. Langeraar, *Surveying and Charting of the Seas*, Elsevier Oceanography Series, No 37, 1984, p 612.
[11]See P.B. Beazley, 'Half-effect applied to equidistance lines', *International Hydrographic Review*, Vol LVI, No 1, January 1979, pp 153–160.
[12]W. Langeraar, *op cit*, Ref 10, p 512.

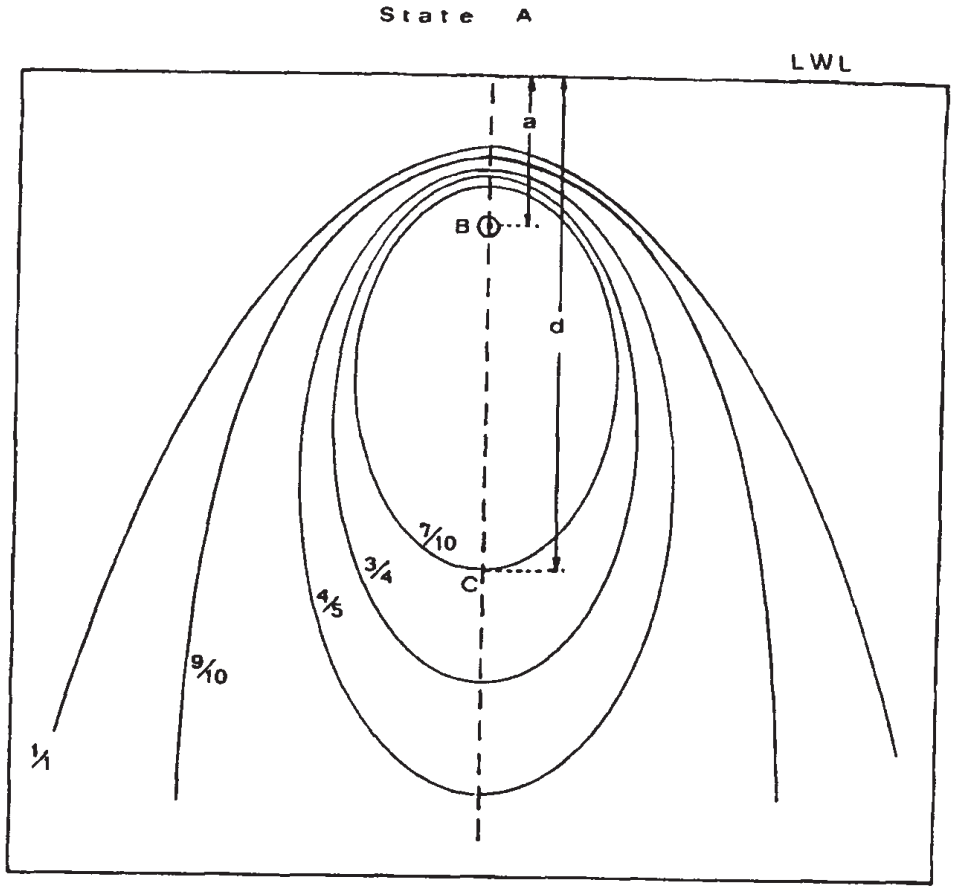

Figure 1. Coastal State A is shown with a straight low-water line and independent island State B can be considered to consist of a mathematical point. A number of delimiting boundary lines are shown, such as the equidistance line indicated by 1/1. The other curves represent loci of points which move in such a manner as to satisfy a particular ratio of their distances from the island and from the continental low-water line. The functional relationship that exists between 'a', 'd' and the ratio is described in the text.

the tendency of the equidistance delimitation to become increasingly inequitable further offshore, ie in the particular case of an independent offshore island state opposite the continental coastline of another state. In Figure 1 this situation is examined more closely in simplified form.

It is assumed that independent island State B can be represented by a mathematical point. Island B lies opposite the continental coastal State A of which the low-water line can be depicted by a straight line. From analytical geometry it is known that the equidistance boundary line between A and B – in this stylized case – is formed by a parabola. This is shown by the curve '1/1', where '1/1' indicates that the boundary line (the parabola) is the locus of a point which moves in such a manner that its distance from a fixed point (the focus = island B) is equal to its distance from a fixed straight line (the directrix = the low-water line of State A), a definition which in this case fully covers the equidistance method of delimitation.

As the parabola will continuously move further away from its axis, it follows that farther offshore the island's claim to part of the continental shelf area will become more and more disproportionate, a situation scarcely acceptable to coastal State A. Figure 1 also shows, however, how in this case the increasingly inequitable parabolical boundary line can be replaced by an elliptic one of which the dimensions can be changed as need be, according to a continuously moving scale. The curve denoted '9/10' for instance is the locus of a point which moves in such a manner that its distance from 'point' B equals nine-tenths of its distance from the low-water line of State A. This curve, and all curves for which the fraction 'distance to point/distance to line' is smaller than unity, represents an ellipse. The reader will have little trouble to check

that any point of, for example, the 3/4 ellipse has a distance from point B which equals 0.75 times its distance from the low-water line of State A.

The above approach has an additional advantage, but the mathematics will not be gone into in this article. It can be shown, however, that the distance of the apogee of the ellipse (eg point C) from the low-water line can be calculated beforehand. It can easily be shown that this distance $d = a.q/(q-p)$ in which p and q are the numerator and denominator, respectively, of the fraction 'distance to point/distance to line'. For the underlying mathematics, the reader is referred elsewhere.[13]

The equiratio method

It is on the basis of considerations similar to those expounded above that the equiratio method of delimitation of maritime areas has been developed. Mathematically the equidistance method is a borderline case of the equiratio one. This already points to the versatility of the equiratio method, one particular mode of which only represents the equidistance method. The nature and character of this versatility will be briefly described. The equiratio method of delimitation can be defined as follows:

> A boundary line between the offshore areas under the jurisdiction of two coastal states, either adjacent or opposite, will be called an equiratio line when every point of it will be defined by a constant ratio of its distances from the nearest points of the baselines from which the breadth of the territorial sea of each state is measured.

As will become clear this definition ensures more universal applicability for the equiratio method, thereby adapting it to different requirements. Lines or curves which may be constructed on the basis of the above definition show a variety of forms. From experience it is known that even a simple equidistance boundary line is generally a composite made up of a number of straight lines, which are parts of perpendicular bisectors of the two nearest points of the low-water line of each state. Delimitations performed according to the definition of equiratio generally will also be composed of finite stretches of lines or curves. Once again the relevant mathematics will be omitted, but it can be shown that the curves when they occur will be either arcs of circles or parts of ellipses, parabolas or hyperbolas. Though slightly more complex than the construction of equidistance lines, equiratio boundaries can be constructed without any problem. Their extreme flexibility and adaptability to varying circumstances, moreover, make them a valuable tool for negotiators considering the political options open to negotiating parties. It can safely be assumed that the hydrographic surveyor, who generally will be seconded to a team of national negotiators, is aware of the mathematical and practical intricacies of such constructions and of their portrayal on different types of charts.

In order to demonstrate the new method in practice and to give politically interested readers a better insight into its powerful ability to solve problems of equitable delimitation in the face of contesting viewpoints, the method will be tested against some of the recent judgments in such matters by the International Court of Justice.

[13] See W. Langeraar, 'Equitable apportionment of maritime areas through the equiratio method', *Hydrographic Journal*, No 36, April 1985, pp 19–28.

North Sea continental shelf cases of 1969[14]

In the North Sea continental shelf cases Denmark and the Netherlands on the one hand and FR Germany on the other asked the International Court of Justice to decide what principles and rules of international law are applicable to the delimitation of the areas of the continental shelf between these countries. The decision to refer this question to the Court was taken after negotiations between FR Germany and Denmark and the Netherlands broke down, mainly because the latter two parties wished the equidistance method of delimitation to be applied in the entire area of the continental shelf subject to partitioning, whereas FR Germany considered that such an outcome would be inequitable because it would unduly curtail what it believed should be its proper share of continental shelf area, on the basis of proportionality to the length of its North Sea coastline.

The contention of Denmark and the Netherlands was founded partly on the 1958 Geneva Convention on the Continental Shelf and was influenced by the fact that both countries had already negotiated partial boundary lines with FR Germany – from the low-water lines to a few miles offshore – based on the equidistance principle (see lines A–B and C–D in Figure 2). Denmark and the Netherlands already had agreed upon their mutual delimiting boundary line, based on the equidistance method of partitioning, as shown by line E–F in Figure 2, in which point E is equidistant from the nearest points on the low-water lines of the three adjacent coastal states. Essentially Denmark and the Netherlands wished to connect the points B and E on the Danish side and the points D and E on the Dutch side according to the equidistance method of partitioning. The dashed lines in Figure 2 show these equidistance boundary lines.

Without going further into the juridical problems and niceties relating to this case it suffices to describe the main judgment and adjucation of the Court. The Court found, by 11 votes to six, that:

- in each case the use of the equidistance method of delimitation is not obligatory as between parties;
- there is no other single method of delimitation the use of which is in all circumstances obligatory; and further
- the principles and rules of international law, applicable to the delimitation as between parties of the areas of the continental shelf, include that delimitation is to be effected by agreement in accordance with equitable principles and taking account of all the relevant circumstances, in such a way as to leave as much as possible to each party all those parts of the continental shelf that constitute a natural prolongation of its land territory into and under the sea, without encroachment on the natural prolongation of the land territory of the other.

The judgment ended with a summing up by the Court of relevant circumstances which should be taken into account when parties were to start new negotiations in order to arrive at an equitable solution. Such negotiations took place and in 1971 the three countries arrived at boundary lines acceptable to all three, as is shown in Figure 3 where the negotiated boundary lines are shown in solid lines. The dotted lines show the proposed delimitation as was portrayed in Figure 2. Although this agreed delimitation takes into account some special features and the

[14]International Court of Justice, *North Sea Continental Shelf Cases (Federal Republic of Germany/Denmark; Federal Republic of Germany/Netherlands)*, judgment of 20 February 1969, p 258.

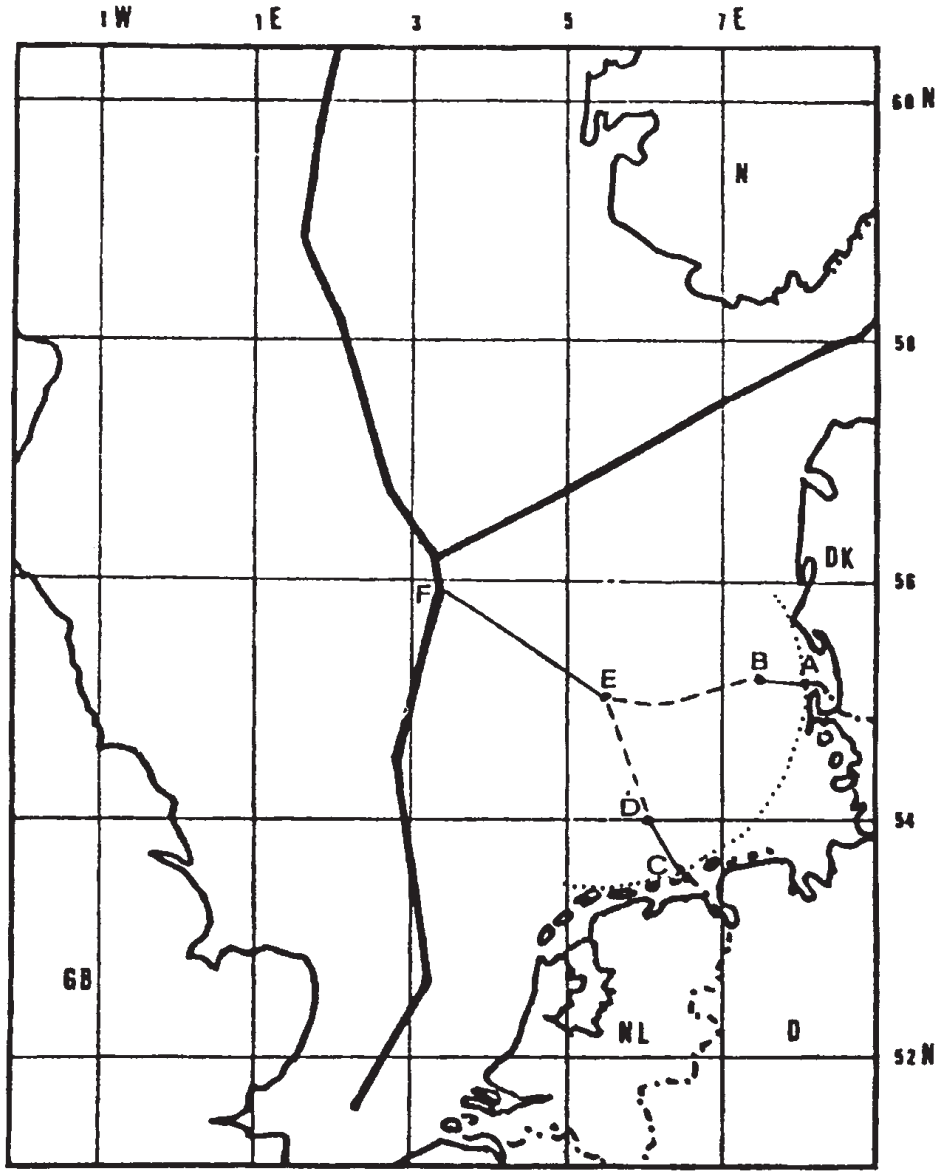

Figure 2. The continental shelf area of the North Sea with the boundaries between the UK, Norway, Denmark and the Netherlands, as well as between Norway and Denmark (solid lines). Line A–B represents the partial boundary line negotiated between Denmark and FR Germany, line C–D a similar line negotiated between the Netherlands and FR Germany. Both these negotiations were based on the equidistance principle, as was the delimitation of the shelf area between Denmark and the Netherlands, line E–F in which point E is equidistant from the nearest points on the low-water lines of Denmark, FR Germany and the Netherlands. The dashed lines E–B and E–D would enclose the continental shelf area appertaining to FR Germany if the equidistance method of delimitation were utilized.

existence of known natural resources or exploration licences already granted, the boundary lines are of a rather arbitrary nature and cannot be considered as leaving as much as possible to each party those parts of the continental shelf that can be seen as the natural prolongation of the land territory into and under the sea.

The question can now be asked what the situation would have been if Denmark and the Netherlands had not insisted that the equidistance method of delimitation be used, but had proposed to FR Germany a partitioning according to the equiratio instead of the equidistance method. The two former countries could have suggested, for example, an equiratio of 0.90 to the advantage of FR Germany, which would have meant that the boundary lines would consist of points which were defined by the fact that their distances from the nearest points on the low-water lines of Denmark or the Netherlands would be nine-tenths of the distances to the nearest points on the low-water lines of the Federal Republic.[15]

In Figure 4 the agreed boundary line referred to in Figure 3 is now shown in greater detail (ie on a larger scale) and consists on the Danish side of the composite line A–B–P–Q–R–S–T–U and on the Dutch side the line C–D–V–W–X. The dashed lines in the picture have been

[15]It is not at all necessary in this case that the same equiratio of 0.90 is used by the two neighbours of FR Germany. The equiratio finally agreed upon is the one which will provide a result that is sufficiently acceptable to both negotiating parties. It would, therefore, be normal to find that the ratio agreed upon between FR Germany and Denmark differs from the one which gives an equitable result between FR Germany and the Netherlands.

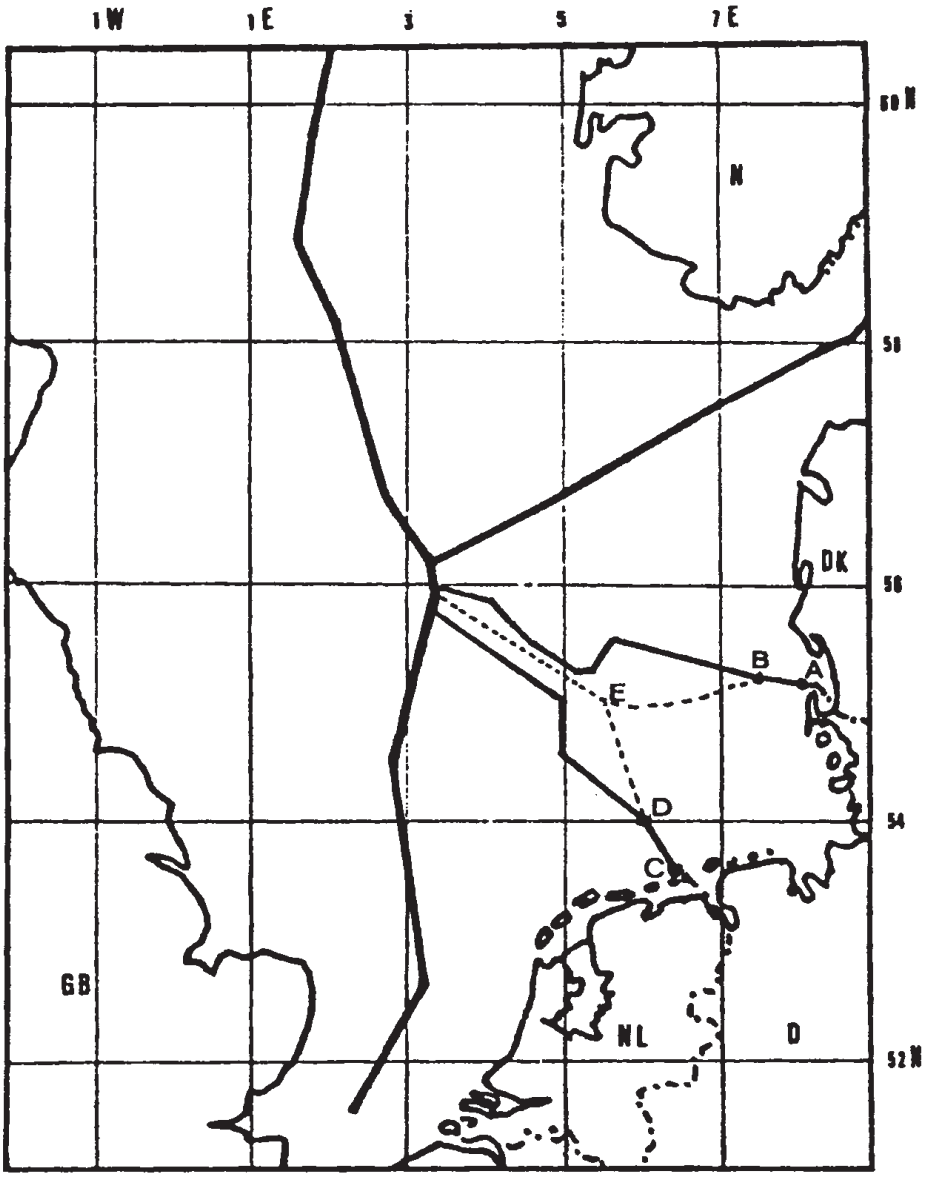

Figure 3. As Figure 2 but with the finally agreed upon boundaries between Denmark and FR Germany on the one side and between the Netherlands and FR Germany on the other, both shown in solid lines. The originally suggested equidistance lines are shown by dashed lines.

constructed in such a manner that for the northernmost line A–Y all distances to the nearest points on the low-water line of Denmark are 0.90 times the distances to the nearest points of the low-water line of FR Germany. The 0.90 equiratio boundary line between the Netherlands and FR Germany is represented by the dashed line C–Z and has been constructed in the same manner as line A–Y.

Especially on the Dutch side the similarity between the agreed and the equiratio boundary lines is striking. On the Danish side it might perhaps have been desirable to try an equiratio of 0.89 or 0.91, but it can be said that an initial proposal from the Netherlands and Denmark to delimit in accordance with an equiratio of around 0.90 might have been acceptable to FR Germany, taking into account the boundary lines it finally agreed to.

Case concerning the continental shelf of 1982[16]

The Court was asked to render its judgment in the following matter:

What are the principles and rules of international law which may be applied for the delimitation of the area of the continental shelf appertaining to the Republic

[16]International Court of Justice, *Case concerning the continental shelf (Tunisia/ Libyan Arab Jamahiriya)*, judgment of 24 February 1982, p 309.

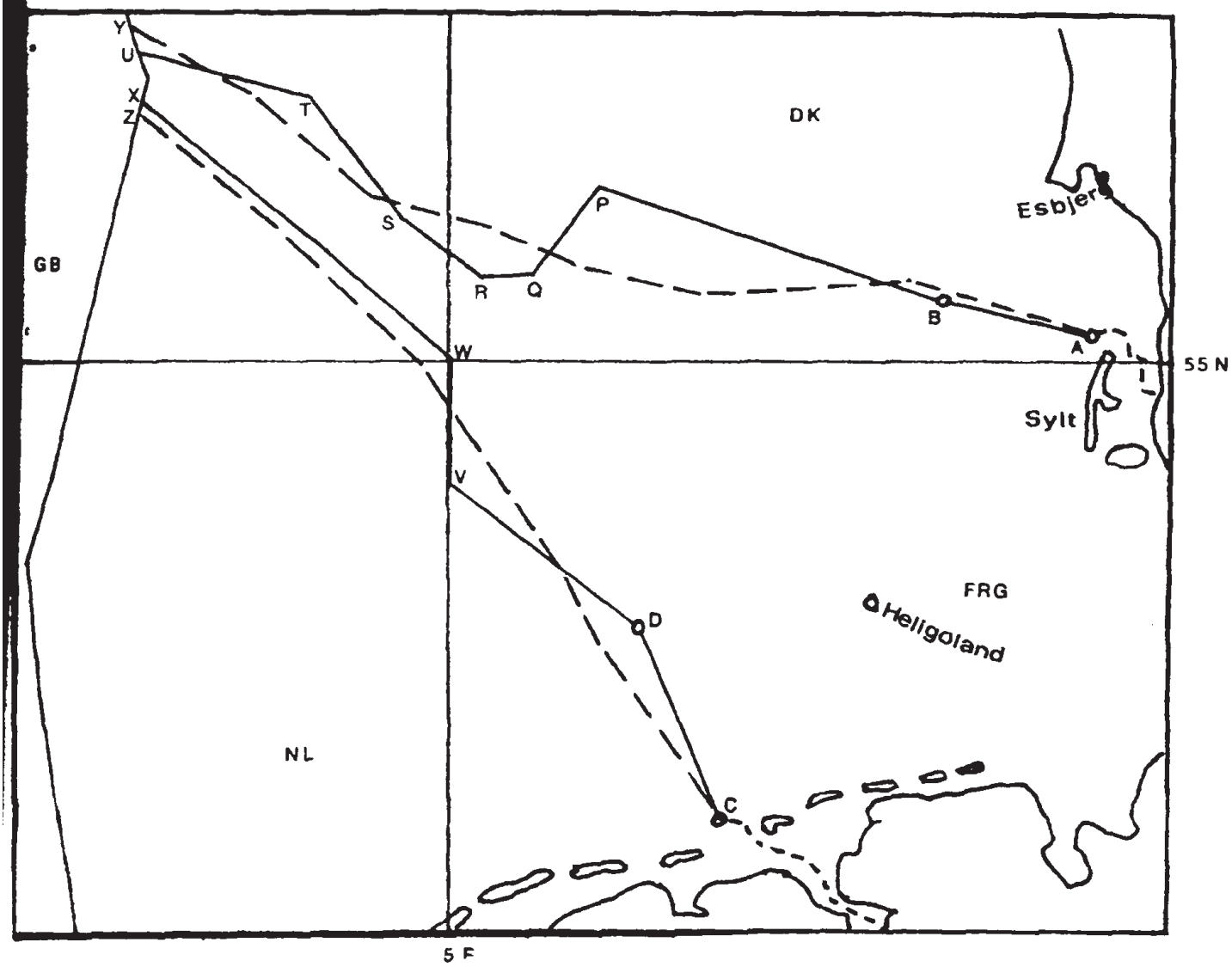

Figure 4. The negotiated boundary lines between the three parties are shown here in greater detail: A–B–P–Q–R–S–T–U (Denmark/FR Germany) and C–D–V–W–X (Netherlands/FR Germany. The dashed line A–Y represents the equiratio boundary line between Denmark and FR Germany and the dashed line C–Z the equiratio boundary line between the Netherlands and FR Germany; in both cases the ratio chosen is 0.90 to the advantage of Germany.

of Tunisia and the area of the continental shelf appertaining to the Socialist People's Libyan Arab Jamahirija and, in rendering its decision, to take account of equitable principles and the relevant circumstances which characterize the area, as well as the recent trends admitted at the Third Conference on the Law of the Sea.

Also, the Court is further requested to specify precisely the practical way in which the aforesaid principles and rules apply in this particular situation so as to enable the experts of the two countries to delimit those areas without any difficulties.

It was accepted by both sides that equitable considerations would not justify a delimitation whereby one state was permitted to encroach on the natural prolongation of the other. However, the relationship between the concept of natural prolongation and the need for any delimitation to be effected in accordance with equitable principles has been conceived in a different way by each party. This is clearly shown in Figure 5 where the line E–Q–R represents the Libyan interpretation of an equitable boundary line, while the sheaf U–T–S–E–V–W portrays

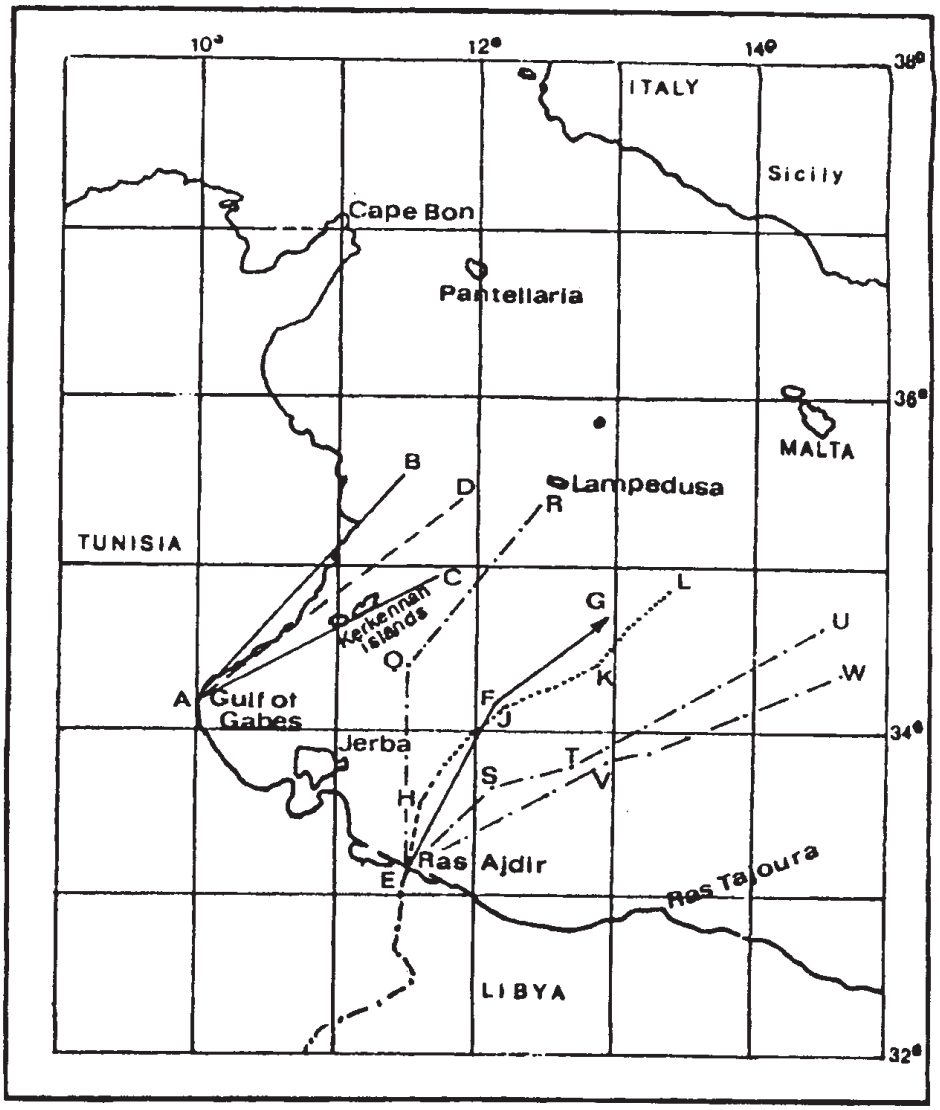

Figure 5. Part of the Mediterranean Sea showing the delimitation of the offshore area between Tunisia and Libya. Line E–Q–R represents the original Libyan interpretation of an equitable partitioning; lines E–S–T–U and E–V–W contain the sheaf of boundary lines proposed by Tunisia utilizing slightly different methods of delimitation. Line A–B portrays the general direction of the continental coastline of Tunisia, line A–C the direction including the geographical position of the Kerkennah Islands. Line A–D is the bisectrix of the angle BAC, has an azimuthal direction of 052° and is used by the Court as a half-effect line. Line E–F–G is the boundary line decided upon by the Court. Section E–F is the extension of a boundary line ashore; the latitude of point F equals the latitude of point A. Section F–G is parallel to line A–D, point G being undetermined but only serving to indicate the azimuthal direction of that section (052°). The line E–H–J–K–L portrays the 0.90 equiratio boundary line, to the advantage of Libya, but taking full account of the position of the Kerkennah Islands of Tunisia.

the envelope of a number of boundary lines resulting from Tunisian methods of delimitation.

It soon became apparent that a crucial role was played by the Kerkennah Islands belonging to Tunisia. They could either be taken fully into account or not at all, while finally the Court judged it in accordance with equitable principles to consider the half-effect line A–D in Figure 5. On the basis of juridical considerations the Court pronounced the equitable boundary line to consist of two sections. The first section (line E–F in Figure 5) is constructed as an extension of the north-western boundary of a number of Libyan petroleum concessions at the Tunisian border, until it intersects with the parallel passing through the most westerly point of the Tunisian coastline between Kaboudia and Ras Ajdir, ie point A in the Gulf of Gabes. The azimuthal direction of this line of delimitation is about 026°.

In the second sector, namely in the area which extends seawards from point F, the line of delimitation is to veer to the east in such a way as to take account of the Kerkennah Islands; that is to say, the delimitation line is to run parallel to a line A–D which bisects the angle BAC and has an azimuthal direction of 052°. The extension of this second sector north-eastward could not be decided by the Court as it will depend on the agreement with third parties. The entire delimiting boundary line is shown in Figure 5 as the line E–F–G, point G not being defined.

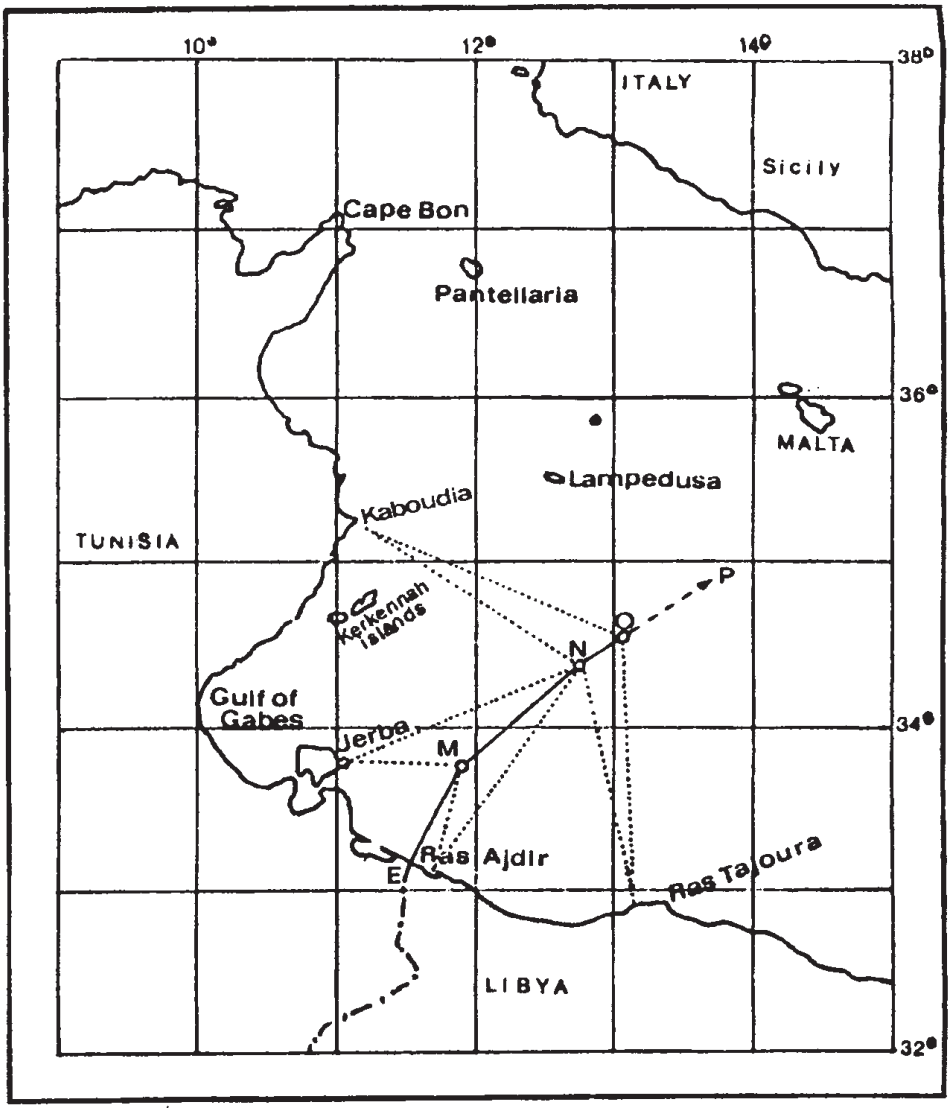

Figure 6. As Figure 5 but showing the boundary line E–M–N–O–(P) as proposed by Judge Shigeru Oda in his dissenting opinion. This line is based on the equidistance principle, but ignoring the existence of the Kerkennah Islands.

In his dissenting opinion Judge Shigeru Oda[17] develops the juridical reasons why he does not agree to use the point of intersection F as the hinge around which to veer the second section of the line of delimitation to the east, nor to the drawing of this second part of the boundary line parallel to the half-effect line AD of the Kerkennah Islands. On the contrary he suggests that the line for the delimitation of the continental shelf between Tunisia and Libya should be drawn as a line equidistant from their respective coasts, disregarding all the low-tide elevations off the coast of either party and the existence of the Kerkennah Islands. The resulting boundary line is shown in Figure 6 as the line E–M–N–O and can be extended in the direction P. The points M and N are where the equidistance line changes its direction; at point M begins the line which is equidistant from the cape east of Ras Ajdir and the easternmost point of Jerba. At point N the equidistance to these two points equals the distances to Ras Tajoura and Kaboudia, so that from point N seawards the boundary line is formed by the perpendicular bisector between these two new points. Point O is part of this bisector and is equidistant not only from Tajoura and Kaboudia, but also from Malta. From point O in the direction of P, along the same bisector, Judge Oda drew a dashed line as the delimitation of the continental shelf between Libya and Malta had not then been agreed upon.

However, it could also have been decided to take the Kerkennah

[17] *Ibid*, pp 143–274.

Islands fully into account, but because of their geographical position off the Tunisian coast it then would have been desirable to utilize the equiratio method of delimitation. This has been attempted by the author and again a ratio of 0.90 to the advantage of Libya was chosen.[18] As was said earlier this implies that a boundary line thus constructed consists of points all of which have distances to the nearest points of the Tunisian baseline which are nine-tenths of the distances to the nearest points on the baseline of the Libyan coast. Returning to Figure 5 this 0.90 equiratio boundary line is represented by the dotted line E–H–J–K–L in which L does not necessarily mean the end of the boundary line.

Comparison of this equiratio boundary line with Judge Oda's equidistance line, or the boundary line decided upon by the Court, shows that the equiratio line brushes both lines alternatively. This coincidence of the three lines, however, is less important than the fact that the equiratio boundary line can be constructed in a mathematically unambiguous manner, leaving out the possibility of any subjective approach. An additional advantage in the case described above, according to the author, is the fact that also the exposed parts of the Tunisian territory, the Kerkennah Islands, could be fully taken into account. Moreover, by slightly changing the ratio, small variations in the boundary line can be achieved, thereby enhancing the possibilities that an agreement between negotiating parties can be reached on the final value of the ratio to be utilized.

The influence of an offshore island

In the foregoing paragraph the influence and complication of an offshore island became apparent in the case of delimiting offshore maritime areas, especially when the island could change the direction of the offshore boundary line. In the situation of the Kerkennah Islands three approaches were described. As it seems unwarrantable to ignore completely the islands' existence, some partial-effect treatment may be called for as their geographical position tends to enlarge considerably the area of the continental shelf appertaining to its parent coastal state while the length of the relevant part of that state's coast, measured in the general direction of the coastlines, does not increase, so that there is a danger that in certain cases the reasonable degree of proportionality that ought to be brought about between length of coastline and area of continental shelf, might be upset. It is for this reason that it might be wise to delve a little deeper into the partial-effect possibilities the equiratio method of delimitation may be able to provide.

This is done in Figure 7, where a simplification is shown of a normally more complex situation. The figure portrays two adjacent coastal states Q and P of which the border intersects with the low-water line at point A. This low-water line is shown as a straight line. State P owns the offshore island P which is to be considered as a mathematical point. In Figure 7 six different situations are shown. In (a) the offshore delimitation is performed by using the equidistance method, as indicated. This means that the offshore boundary line is represented by composite line A–B–D. Without the offshore island the equidistance boundary line between the two states would have been the line A–C. Point B is the point of intersection between this latter boundary line and the parabola which in this mathematical case represents the boundary

[18]It is of course purely coincidental that here, as in the North Sea continental shelf cases, an equiratio of 0.90 is chosen. Dependent on the situation *in situ* any other value might have been possible, the only restriction being that the value to be chosen must be equally agreeable to both parties.

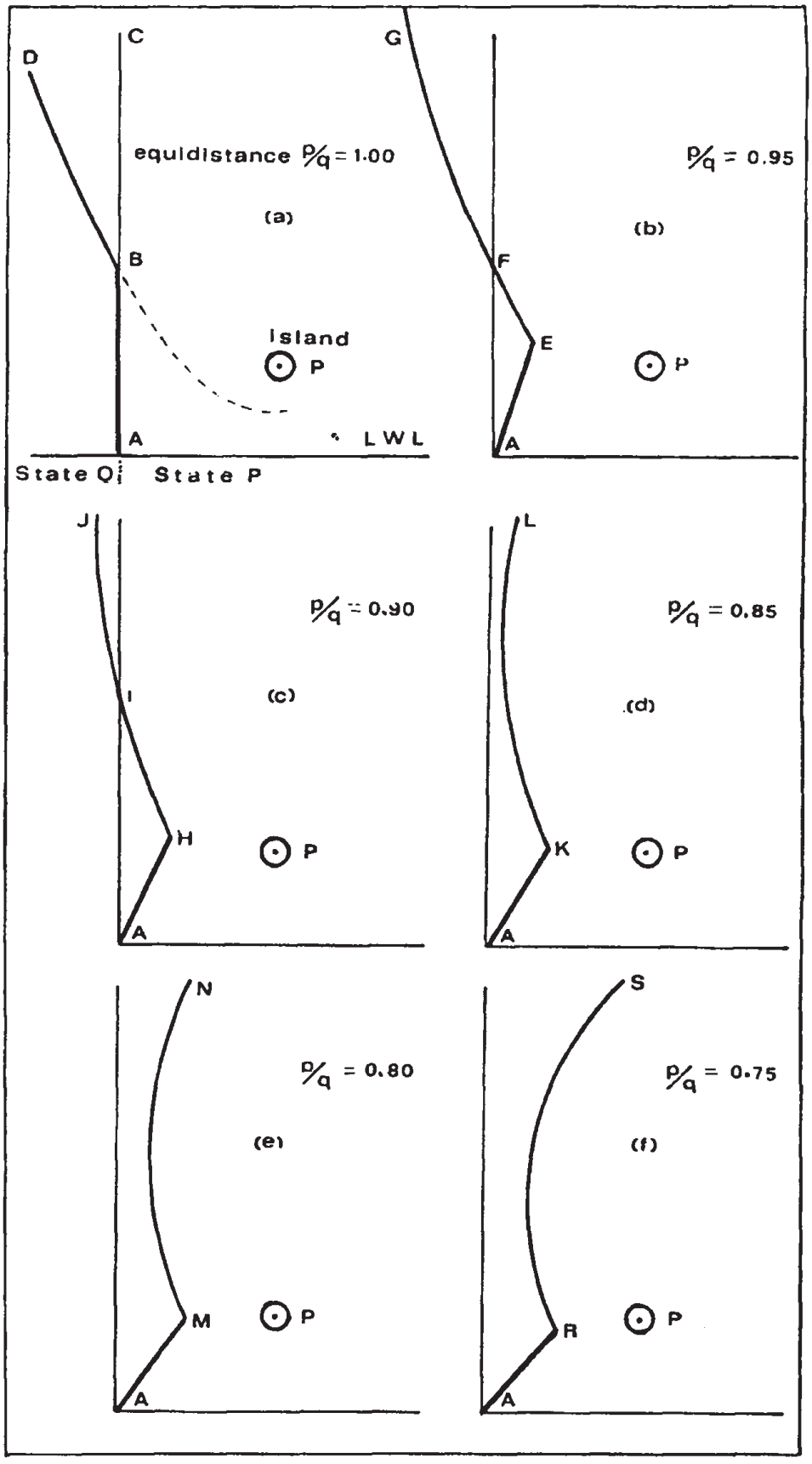

Figure 7. Six aspects of the same terrestrial situation, but with increasingly changing offshore boundary lines. Two continental coastal states Q and P have a continuous straight low-water line, with the island P – belonging to State P – lying off the coast of state P. The offshore boundary lines vary from equidistance to an equiratio of 0.75.

line between island P and state Q. As it may well be that state Q does not consider the course of boundary line A–B–D as being in accordance with an equitable delimitation of the offshore area, the use of some partial-effect measures may be called for. This is done by application of the equiratio method using different ratios in (b) to (f). This

presentation clearly shows the versatility of the method, which, by having at its disposal an infinite number of ratios, will be able to meet a great variety of demands.

The case concerning the continental shelf of 1985[19]

The International Court of Justice was requested to declare and adjudge the principles and rules of international law applicable to the delimitation of the areas of the continental shelf which appertain to the Republic of Malta and to the Socialist People's Libyan Arab Jamahirija, as well as to decide how in practice such principles and rules can be applied in this particular case.

The Court, in replying to the first part of the above question, has confined itself to areas where no claims by a third state exist, that is to say, the area between the meridians 13° 50′ E and 15° 10′ E.

Contention in this case arose from the claim of Malta to apply the equidistance principle, which in the present situation meant a median line as the boundary line between the areas of the continental shelf appertaining to each of the parties. First for geological reasons (not accepted by the Court), and second submitting that the delimitation should take account of the significant differences in lengths of the respective coastlines, Libya claimed a larger area of the continental shelf than would be the case when the equidistance principle of delimitation was applied.

During its deliberations the Court accepted the median line as the first step of the delimitation, considering that relevant circumstances indicated that some northward shift of that boundary line was needed in order to produce an equitable result. These circumstances are:

- the islands of Malta appear as a relatively small feature in a semi-enclosed sea; and
- the great disparity in the lengths of the relevant coastlines of the two parties.

For a number of reasons the Court finally decided that the equitable boundary line shall be a line produced by transposing the median line northwards through 18′ of latitude. This adjusted line and the median line are shown in Figure 8. In its judgment the Court does not explain *why* a transposition of the median line northwards over 18′ of latitude results in a boundary line which achieves an equitable delimitation determining the limits between the areas of the continental shelf appertaining to Libya and Malta. In his dissenting opinion Judge Shigeru Oda[21] questions this transposition qualitatively as well as quantitatively and – for a number of reasons – suggests an equidistance line of delimitation.

The question now arises what would have happened if the negotiating parties – before referring their case to the Court – during their *pourparlers* had been able to agree, in principle, on the application of the equiratio principle as governing the delimitation procedure. In Figure 8 an illustration is given of the possibilities of the method by the construction of the 0.60 and of the 0.75 equiratio boundary lines.[22] Of course it cannot be said that such an approach would have been successful as it did not take place and as the method had not been developed then. Figure 8 presents the equiratio method as a potentially powerful tool in the hands of negotiators representing opposing parties

[19]International Court of Justice, *Case concerning the continental shelf (Libyan Arab Jamahirija/Malta)*, judgement of 3 June 1985, p 178.

[20]*Ibid.*, p 43, Paragraph 73.

[21]*Ibid*, pp 123–170. Especially on p 129, in Paragraph 26, Judge Oda questions the equitable result achieved by transposing the median line 18′ northwards.

[22]Though this construction clearly shows that with the aid of the equiratio method a great number of unambiguously defined boundary lines could be arrived at, while the 0.75 equiratio line lies quite near the boundary line decided by the Court, it remains to be seen whether, for example, a suggestion of Libya to divide the continental shelf area in the ratio 1 : 0.74 (advantage Libya) would have been a discussible proposition in the eyes of Malta.

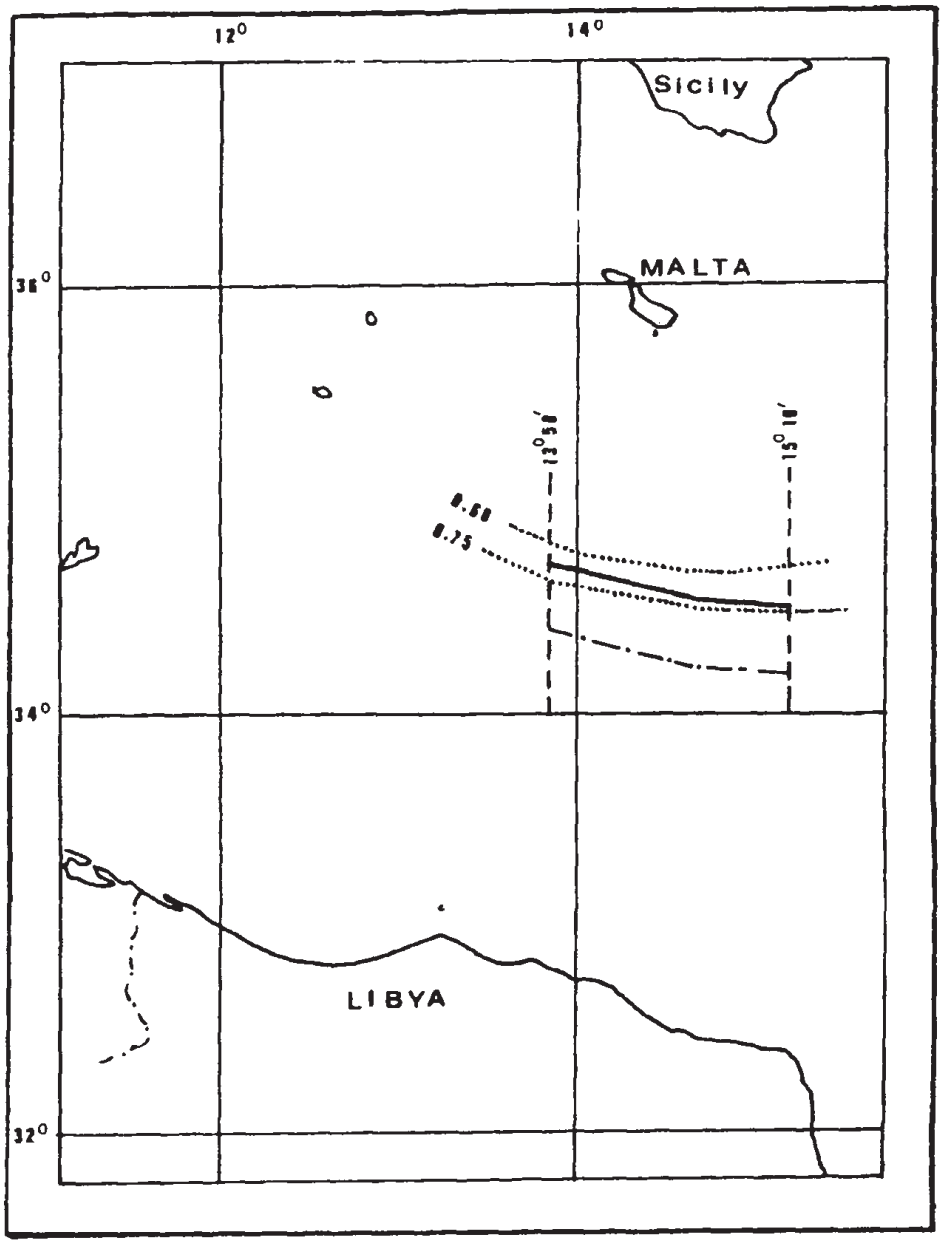

Figure 8. Central part of the Mediterranean Sea showing a portion of the delimitation of the continental shelf area between Malta and Libya. The Court restricted its decision to the area between the meridians of 13° 50′ and 15° 10′. The dotted-dashed line represents the equidistance boundary line between the two countries. The solid line portrays the equitable solution decided upon by the Court. The dotted lines represent the 0.60 equiratio and a 0.75 equiratio boundary line, delimiting the continental shelf area between Malta and Libya to the advantage of Libya.

and trying to agree on a mutually acceptable notion of equity often in the face of contrariety.

Final remarks

- This article has been written with the view of calling attention to a more versatile method of delimitation of offshore areas, without going too deeply into the mathematical background.
- The physical earth shows very few completely straight low-water lines (if any at all), as shown in Figure 1, nor many independent island states that can be represented by a mathematical point for that matter. Nevertheless, these same irregular terrestrial features do allow of the application of the equiratio method as outlined in this article. Essentially the construction of an equiratio boundary line does not differ significantly from that of an equidistance line; the same 'trial-and-error' method well known to hydrographic surveyors can be used.[23]
- The examples of comparison of the application of the equiratio

[23]See for the construction of equidistance boundary lines, for instance, A.L. Shalowitz, *Shore and Sea Boundaries*, pp 230–235; US Department of Commerce, *Coast & Geodetic Survey*, Vol 1, 1962, p 420.

principle to agreed boundary lines, or those decided by the Court, are only a few out of a number of possible ones. Though the author carried out a number of additional comparisons he thought it undesirable to present all of them in this article. Suffice it to say that the equiratio method can be applied in much the same way as the equidistance one, but the former's advantage lies in its ability to satisfy well nigh every nuance of equity.