THE EFFECTS OF CHANGING BASELINES ON THE LIMITS OF THE NETHERLANDS IN THE NORTH SEA

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Abstract

The baseline of the Netherlands in the North Sea is changing in time. The effects of these changes are illustrated by two examples, one of the juridical situation in the Eems-Dollard boundary region with Germany and one of a case against fishermen in the Zeeland region near the Scheldt estuary. We conclude that it is necessary to provide maritime limits to the diverse group of professional users of these limits in other ways than the traditional hydrographic chart.

1. Introduction

The UNCLOS baseline of the Kingdom of the Netherlands in the North Sea consists of a combination of straight[2] and normal baselines. The normal baselines are the zero metre depth lines as depicted on the most recent large-scale nautical chart. They are subject to natural accretion and erosion, and in addition are affected by man-made causes. The gentle slope and sandy character of the coast cause considerable changes in the position of the baseline, like the emergence and disappearance of low-tide elevations near the Scheldt estuary in the Zeeland province and the entrance channels of the Wadden Sea. The normal baselines change every time a new edition of a large scale nautical chart is published.

Therefore, the recent transition of the chart datum of the Netherlands from mean lower low water at spring tide (MLLWS) to lowest astronomical tide (LAT) has been an additional cause of baseline change. The principle of this change in chart datum to a lower level is illustrated by Figure 1. The lower LAT-datum places the normal baselines in a more seaward position. Before June 2006, all relevant charts were published in MLLWS. The last relevant nautical chart in MLLWS was replaced by a new LAT-edition in August 2008. In the intermediate period, the baseline consisted of a mix of normal baselines in MLLWS and LAT. A comparison between the limits before the start of the transition and after the end is given by Figure 2.

[1] until recently at the Hydrographic Service of the Royal Netherlands Navy

[2] defined by the Territorial Sea (Demarcation) Act of 9 January 1985

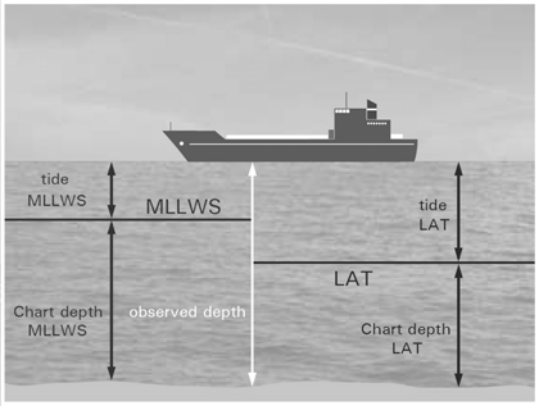

Figure 1: *The under keel clearance of a ship is not changed due to a change in chart datum. The old chart datum of the Netherlands charts is MLLWS, and the new, lower chart datum LAT. The charted depth is decreased, but the tidal height is increased by the same amount.*

2. Implementation of the provisions of UNCLOS

The changes of the baseline give rise to two discussions of technical nature in implementing the provisions of UNCLOS. The first discussion involves the status of the Electronic Navigational Chart (ENC), as a source for the normal baseline. If a new edition of a large-scale ENC is published before the corresponding edition of the paper chart, then the Netherlands Hydrographic Service accepts the ENC as a source for normal baselines, in spite of the limited distribution of ENC-s. This is according to the ABLOS recommendation to recognize an ENC as a valid nautical chart[3].

The second discussion involves the status of disappearing and reappearing low-tide elevations within 12 M of the coast. Two examples are given in Figure 2, indicated by arrows. The top right map shows a new relevant low-tide elevation due to the 2006 edition of chart 1458 in front of the Borndiep entrance channel of the Wadden Sea. The bottom right map shows a new relevant low-tide elevation due to the 2007 edition of chart 110. The Netherlands Hydrographic Service has decided to assume that the low-tide elevations are part of the various coastal zones offered on their site, although they formally lie within the baseline. The alternative option is to show that the zones contain dynamic holes at the position of those low-tide elevations, necessitating the follow-up question of their legal status.

[3]Section 3.2 of A manual on the technical aspects of the United Nations Convention on the Law of the Sea - 1982. IHO Special Publication 51, 4th edition, 2006. Published by the International Hydrographic Bureau, Monaco.

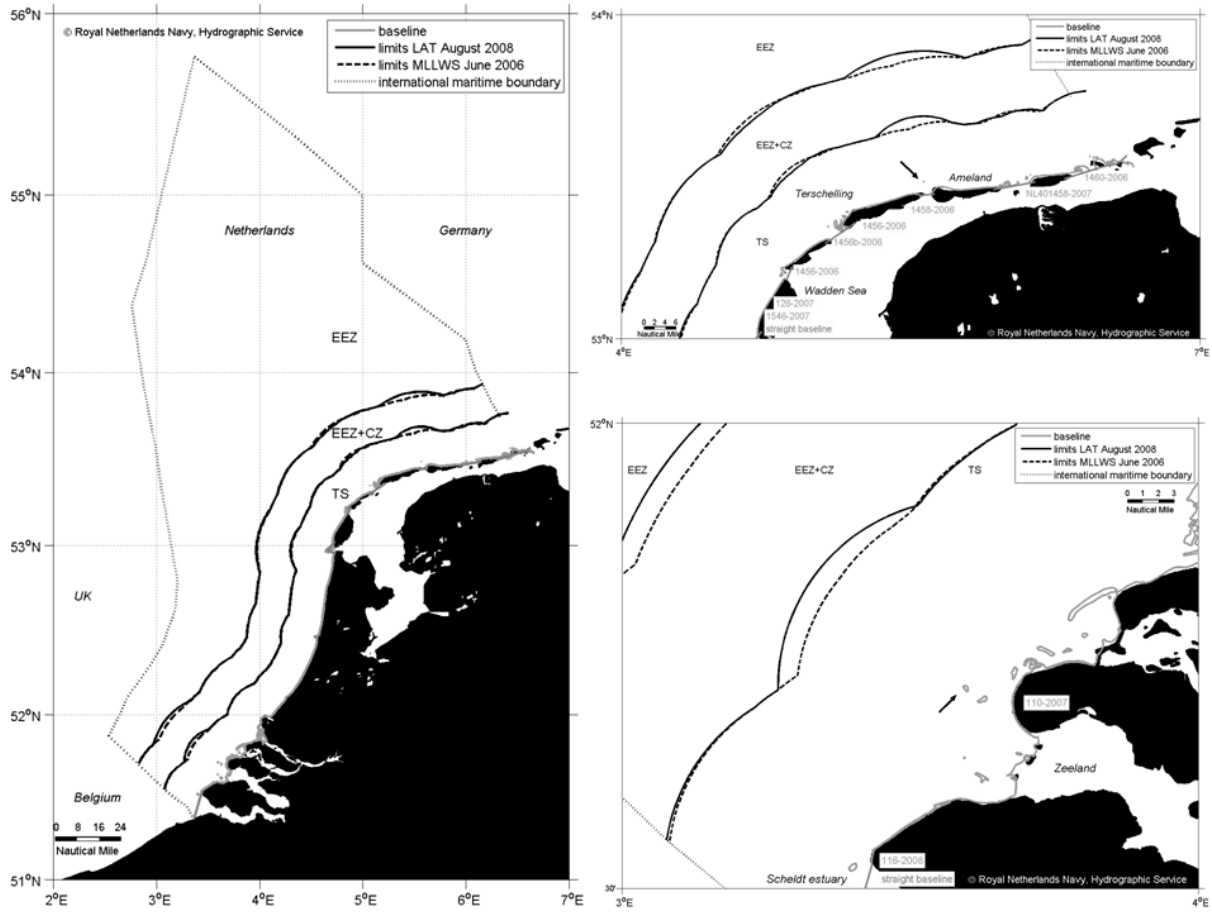

Figure 2: *Changes in the maritime limits of the Territorial Sea (TS), the Contiguous Zone (CZ) and the Exclusive Economic Zone (EEZ) of the Netherlands in the North Sea, due to the emergence of new low-tide elevations. The changes are not only caused by sea floor dynamics, but also by the transition of chart datum from MLLWS to LAT. Left: overview; top right: entrance channels of the Wadden Sea, the channel between the islands of Terschelling and Ameland is called the Borndiep; bottom right: Zeeland coast, North of the Scheldt estuary. Note the large effect of the two new low-tide elevations, indicated by arrows in the two maps on the right side.*

3. Effects of changing baselines

The effects of changing baselines can be very large. A change in depth of a few decimetres is able to make horizontal changes in baseline position of several kilometres. One should keep in mind that even modern large scale charts are not always accurate. Bathymetric surveying in shallow tidal waters, like the Southern North Sea, has an uncertainty of several decimetres[4]. Also, cartographers need to make scale-dependent generalizations to produce clear depth lines on nautical charts. For the safety of navigation, this is done in the shoal direction only, known as shoal biasing. Therefore, the large baseline changes are in fact a consequence of the juridical co-usage of a product designed for the non-juridical purpose of navigation. We will illustrate the juridical effects of changing baselines with two examples.

3.1 Example 1: the Eems-Dollard

Often, the changing UNCLOS baselines are used to define marine areas, without recognizing the problem of baseline dynamics. An example is the definition of the area of the Eems-Dollard treaty[5], and the differing definition in the Supplementary Agreement to the Eems-Dollard treaty[6]. The Dollard is part of the estuary of the Eems river in the Netherlands-German boundary region, where the maritime boundary in the territorial sea has not yet been delimited. The Eems-Dollard treaty is for instance relevant for the heavy industry located at the Eemshaven port, and for maintenance and dredging of the maritime traffic lanes towards the port of Delfzijl. The Supplementary Agreement aims to regulate the exploration for and production of oil and gas.

The situation is presented in Figure 3. The Figure shows the current 3M limit and the current 12 M limit. The 3 M limit was the limit of the territorial sea until 1985, when the territorial sea was enlarged to 12 M instead[7]. The Eems-Dollard treaty of 1960 is limited to the intersection of the 6 m depth line and the outer limit of the territorial sea, at that moment 3 M from the baseline. To provide the oil and gas industry with fixed limits, the Supplementary Agreement to the Eems-Dollard treaty is limited sideways to a set of coordinates, and has the 3 M limit in 1962 as its outer limit. Changing baselines have created a very complicated situation for the boundary negations between the two countries.

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[4] IHO Standards for hydrographic surveys. IHO Special publication 44, 5th edition, 2008. Published by the International Hydrographic Bureau, Monaco.

[5] Treaty between the Kingdom of the Netherlands and the Federal Republic of Germany on the cooperation in the mouth of the Eems river (translated from Dutch by authors) of 8 April 1960

[6] Supplementary Agreement to the Treaty between the Kingdom of the Netherlands and the Federal Republic of Germany on the cooperation in the mouth of the Eems river (translated from Dutch by authors) of 14 May 1962

[7] Territorial Sea (Demarcation) Act of 9 January 1985

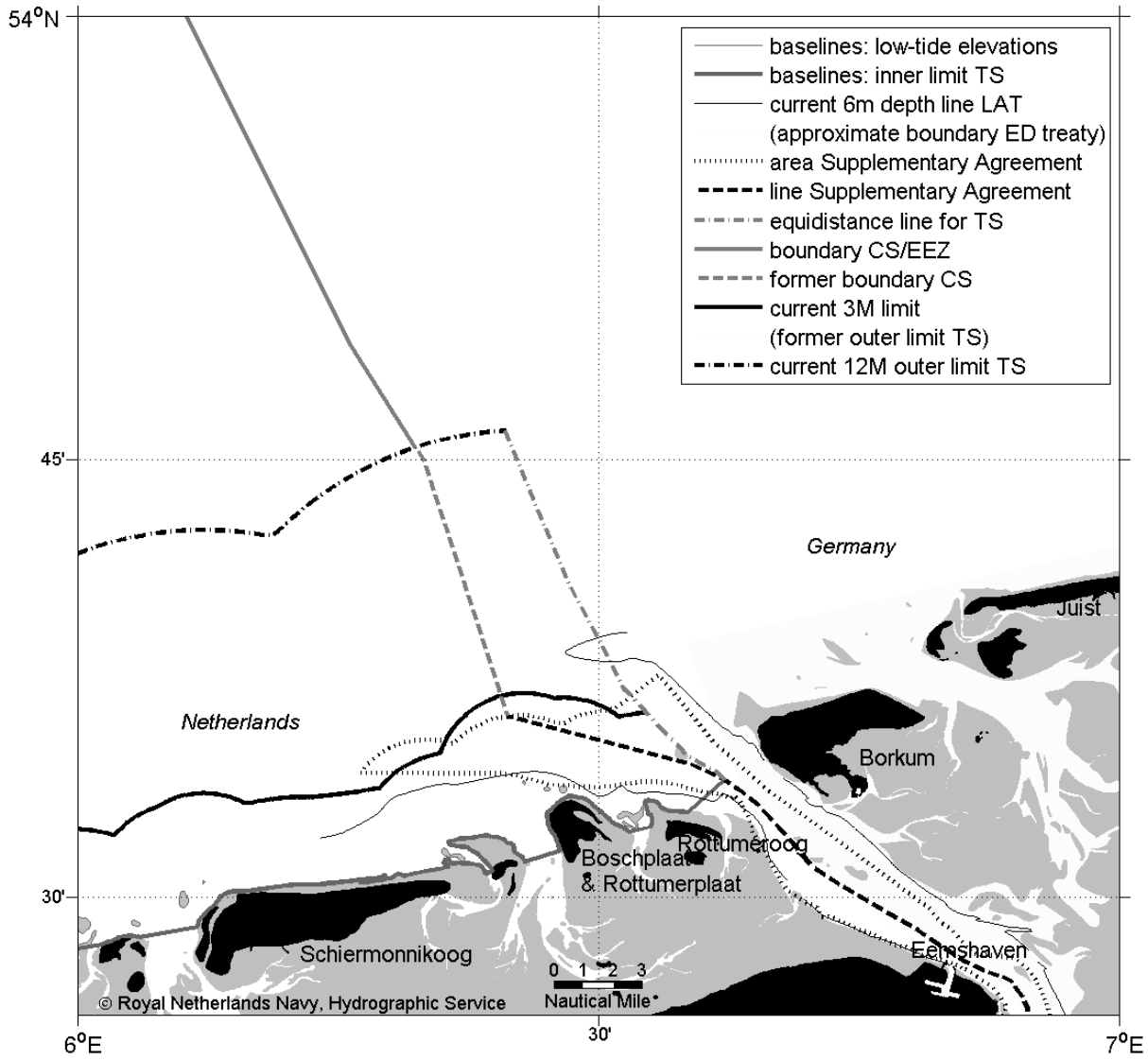

Figure 3: *There is no maritime boundary between The Netherlands (Western islands) and Germany (Eastern islands) to delimit the Territorial Sea. The current 3M limit and the current 12 M limit are shown. The Eems-Dollard (ED) treaty of 1960 is limited to the intersection of the 6 m depth line and the outer limit of the territorial sea, at that moment 3 M from the baseline. The Supplementary Agreement to the Eems-Dollard treaty is limited to the 3 M limit in 1962.*

3.2 Example 2: fishery inspection

Some of the maritime limits used for fishery law run through rich fishing grounds, e.g. in front of the Zeeland coast. One day, a sand bank could be at one side of the outer limit of the Territorial Sea. The next day, this bank could be at the other side. Figure 4 illustrates this with an example for which the expertise of the Netherlands Hydrographic Service was used by a Dutch Court[8]. A fishing vessel was stopped by inspectors because of alleged illegal fishing activities at the 15th of December 2004. A new edition of the relevant nautical chart 110 became valid on the 23rd of December of that year.

If the vessel would have been fishing at the same position after the new chart had become valid, she would have been outside the territorial sea. The consequence of this is that the fishermen would not have been found guilty. The cause of this shift in the limit of the Territorial Sea is the disappearance of the same low-tide elevation that reappeared in the 2007 LAT-edition of chart 110 (See Section 2.). This is logical, as the LAT datum surface at the position of the low-tide elevation is about 3 dm beneath the MLLWS datum surface.

4. Consequences of changing baselines

The first example of the Eems-Dollard region shows that delimitation at sea should be done with great care. It could be attractive to use physical features for that purpose like a depth line, or an existing maritime limit like the outer limit of the Territorial Sea. If this choice is made, one should realize that the nature of the seabed, including the normal baselines, is often dynamic, and make provisions to deal with the effects of that. These provisions include easy access to updates of the limits. For the example of the Eems-Dollard, users of the limits are for instance the oil and gas industry, the heavy industry located in the Eemshaven port, and government officials responsible for the shipping lanes. All of those users are better served by the availability of specific data sets, instead of a nautical chart designed for another purpose, navigation.

[8] Award of the economic police court in the case against Marijs, gebroeders H. en B., V.O.F. (translated from Dutch by authors) of 29 June 2007

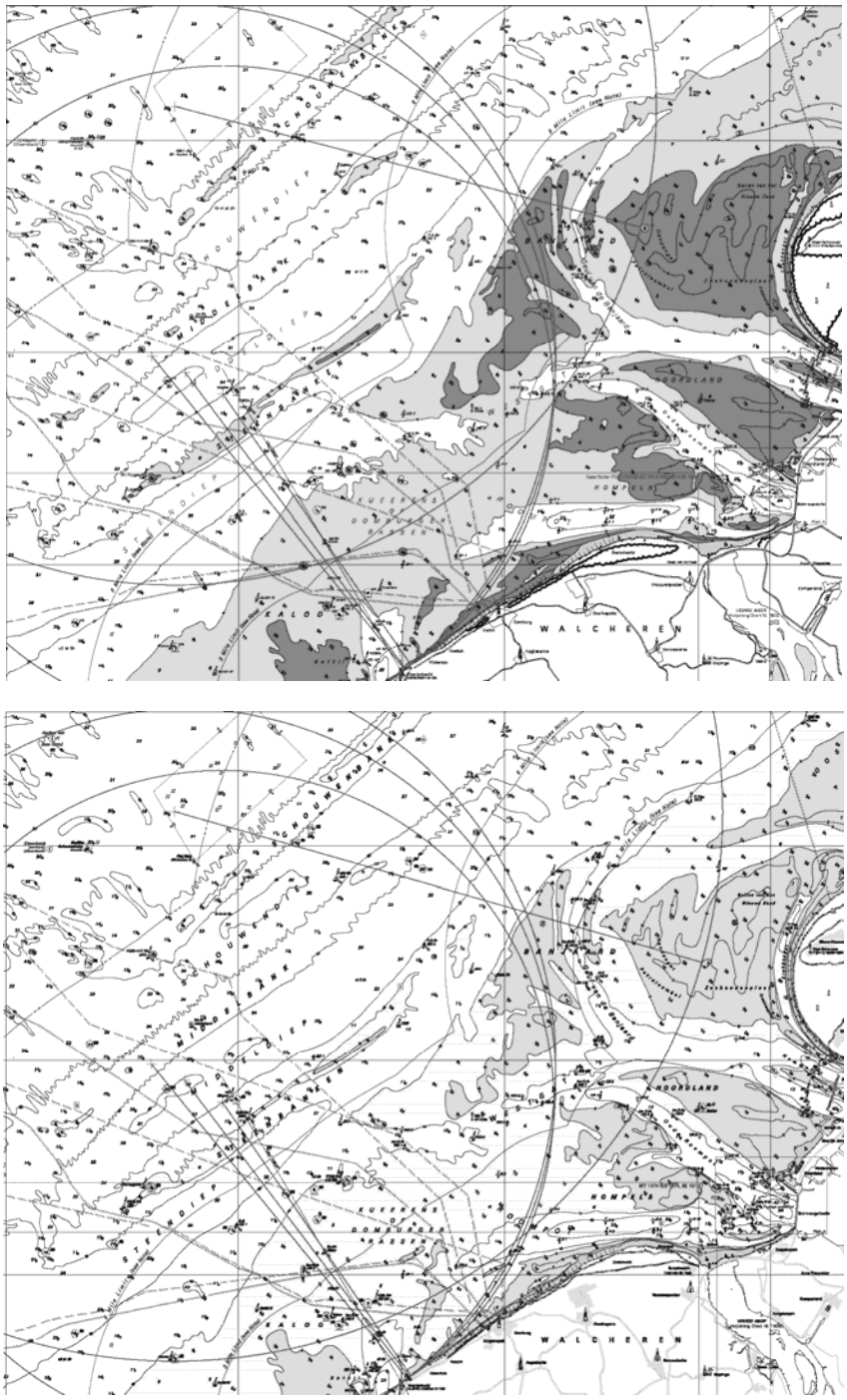

Figure 4: *four positions of the fishing vessel (+) plotted on Netherlands chart 110, edition 2002 (top), and edition 2004 (bottom). The vessel was caught fishing at the 15th of December 2004. The new edition became valid on the 23rd of December 2004. The large circles around the positions indicate the shortest distance to a point of the baseline, to which a line is drawn. Only the single Northern position was accepted by the Court. If the vessel would have been fishing there after the new chart had become valid, she would have been outside the Territorial Sea.*

One clear question arises from the second example: Can we expect mariners, like the fishermen and the inspectors, to be instantaneously aware of changes? The answer to this question tends towards a 'no' if we realize it is often impossible to be instantaneously aware of new editions of charts while at sea, or to acquire them. Also, specialized companies like Chartworx and Holland Nautic provide alternative information systems especially designed for fishing, which they regularly update. Moreover, there are categories of mariners that are not obliged by the SOLAS[9] regulations to carry an adequate set of recent nautical charts on board.

The examples show that national hydrographic offices have a responsibility to give access to the baseline and relevant limits in alternative ways. For the Netherlands Hydrographic Service, the INSPIRE[10] initiative of the European Union has been an additional stimulus to offer the limits on their internet site[11] free of charge in several formats. Updates of the limits are announced by Dutch NtM and e-mail. Users of this service include the companies that provide fishery information systems, fishery inspectors, gouvernment institutions, and the oil and gas industry.

5. Conclusion

Changing baselines complicate the implementation of the provisions of the United Nations Convention on the Law of the Sea. To offer adequate assistance to the diverse group of professionals that is affected by these complications, Hydrographic Offices should provide other sources for the relevant data than their nautical charts.

[9]International Convention for the Safety of Life at Sea. Published by the International Maritime Organization, 1974.

[10] Infrastructure for the Spatial Information in the European Community, Directive 2007/2/EC of the European Parliament and the Council of 14 March 2007, published on 25 April 2007

[11] www.hydro.nl

Biographies

Leendert Dorst finished his MSc-study in Geodetic Engineering at the Delft University of Technology in 1999. He has been employed at the Netherlands Hydrographic Service (NLHS) since. His tasks include consultations on hydrographic surveying, maritime positioning, coordinate systems, and technical aspects of the law of the sea. He participated in the IHO S44 working group on Standards for Hydrographic Surveys. Since 2004, he combines his work for the Netherlands Hydrographic Service with a position as a PhD candidate at the University of Twente, studying sea floor dynamics by the analysis of time series of bathymetric surveys using deformation analysis, to improve the resurvey policy of the Netherlands. In 2008, he was promoted to Head of the Department Geodesy and Tides.

Ina Elema received her MSc-degree in Geodetic Engineering from the Delft University of Technology in 1993. During the past ten years, she was Head of the Department Geodesy and Tides of the NLHS, working mainly in the fields of navigation, technical aspects of the law of the sea and tides. Since the summer of 2008, she has been employed at the Water Board Rijnland.