



## Coastal Erosion and Its Impact on Some Aspects of Maritime Boundaries

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### Abstract

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While coastal erosion is fundamentally an environmental issue, coastal erosion can impact basic issues in maritime boundaries like baselines and the question of maritime zones. Such consequences especially in narrow waterways, may be critical particularly where overlapping maritime claims exist. Not unusually, measures to address coastal erosion may produce a counter-productive effect by defeating the very purpose for which the measure seeks to address. As the rate of coastal erosion affects maritime boundary delimitation of different coastlines – including that of island states – in different ways, this article highlights a basic understanding of some aspects including various ways in which coastal erosion affects coastal States. The article also attempts to scrutinise some problems with measures intended to address coastal erosion; and ends with some broad reflections and a way forward, grounded in technology, for States to strategically address issues of coastal erosion.

**Key words:** Coastal erosion; baseline; delimitation; maritime boundaries; maritime zones; overlapping maritime claims

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## Analysis

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### Introduction

Coastal erosion is a widespread problem for coastal States like Malaysia. Coastal erosion impacts also matters concerning maritime boundaries.<sup>1</sup> In November 1984 Malaysia embarked on a study to assess the problem of coastal erosion facing the country. On completion of the study in January 1986, the Government identified that from the 4,809 km coastline of Malaysia about 29%, or 1380 km, experienced erosion.<sup>2</sup> Towards addressing the problem, in 1987 a Coastal Engineering Centre was set-up within the Department of Irrigation and Drainage, Ministry of Natural Resources and Environment, Malaysia ('DID'). In October 2015, DID organised a workshop to discuss findings from a second study on National Coastal Erosion in Malaysia.<sup>3</sup> Among other things, the workshop highlighted that findings to date indicate an increase in the rate of coastal erosion in Malaysia; signalling the urgent need for effective measures to protect the coasts and marine environment of Malaysia. However, coastal erosion is not unique to Malaysia. Tuvalu and Maldives, for example, are among other countries faced with acute problems of erosion.<sup>4</sup> This article is a brief survey on some aspects of how coastal erosion impacts matters concerning maritime boundaries, and why measures to protect the coasts and marine environment require parallel attention alongside matters concerning maritime boundaries.

### Impact of coastal erosion on issues in maritime boundaries

Coastal erosion can significantly impact the drawing of baselines, a fundamental aspect in maritime boundaries. More specifically, coastal erosion impacts questions on when and why either normal or straight baselines should be used.<sup>5</sup> In this context, a preliminary point is imminent: experts have observed that persistent or intermittently rapid erosion can bring about a large-scale change in the shoreline position and coastal configuration, even though the coastal erosion occurs at modest rates.<sup>6</sup> In other words, a change in the shoreline would change the coastline too.<sup>7</sup> For purposes of ascertaining maritime boundaries, including baselines, coastal geography has a prominent role.<sup>8</sup> Some observers consider that the level of impact from coastal erosion differs between different maritime zones,<sup>9</sup> while other experts believe, at least theoretically, that coastal erosion can eliminate entirely the normal baseline and any entitlement to maritime zones generated from the normal baseline.<sup>10</sup> Be that as it may, the argument that maritime boundaries would be affected by changes in the shoreline and coastline brings to bear a core principle in boundary delimitation: the principle of stability. While in the case of land boundaries the ICJ has stated that boundaries are intended to achieve stability and finality,<sup>11</sup> the idea of stability and finality in the case of maritime boundaries might in the first instance appear impossible, considering that matters like coastal erosion can change the shoreline and coastline. Yet, some notion of stability of maritime boundaries is needed because uncertainty in the position, meaning location, of maritime boundaries can lead to conflict.<sup>12</sup> Perhaps the need for such certainty in stability of maritime boundaries lead the ICJ Chamber in the *Gulf of Maine* to declare that a *natural* boundary can be ignored as the Chamber considered that maritime delimitation is a legal-political operation and that "...it is not the case that where a natural boundary is discernible, the political delimitation necessarily has to follow the same line."<sup>13</sup>

The effect of coastal erosion on maritime delimitation may be heightened in narrow waters; where the territorial sea defines the boundary between States. In seeking stability of maritime boundaries, States will



need to select stable basepoints when establishing their maritime boundaries. Yet coastal erosion can cause potentially preferred basepoints to be unstable.<sup>14</sup> Not only would such circumstances from coastal erosion jeopardise sustaining a stable maritime boundary, more importantly, it may be one legitimate basis for maritime boundaries not to be delimited on the basis of equidistance.<sup>15</sup>

The impact of coastal erosion on the shorelines and coastlines, and consequently on maritime boundaries, opens to question a broader issue: whether the use of normal baselines may be abandoned in favour of straight baselines to identify appropriate basepoints. Indeed, Judge *ad hoc* Torres Bernardez in his Dissenting Opinion in *Nicaragua v Honduras* explained that considering the physical geography of the case, using straight baselines would better safeguard the principle of non-encroachment, an integral principle in matters concerning maritime boundaries.<sup>16</sup> Judge Torres went on to explain that the bi-sector method would not only be unsuitable for delimitations in proximity to the coastlines, and consequently for delimitation of the territorial seas; but that perhaps equally important to note, such a line may well prove inequitable especially in a maritime area where economic considerations may not outweigh security and defence interests.<sup>17</sup> Thus, States will need to carefully scrutinise their coastal geography and seek benefit from the LOSC, for example, States may combine the use of normal baselines with the use of straight baselines to suit different conditions.<sup>18</sup> Moreover, generally, severe adverse circumstances of coastal geography may allow appropriate points to be selected along the furthest seaward extent of the low-water line, and that subsequent regression of the low water line would not only be a basis to abandon the use of a normal baseline in favour of a straight baseline, but more importantly, such circumstances may arguably allow the coastal State to sustain the use of a straight baseline.<sup>19</sup> As coastal erosion impacts considerations on maritime boundaries in different ways, it may be worth highlighting a significant practice from States in maritime delimitation: that a delimitation line can be drawn using the principle of equidistance in one segment while another segment of the same line can be drawn on the basis of equitable principles as France and Spain demonstrate in the Bay of Biscay.<sup>20</sup>

### Maritime boundary considerations and issues from measures to address coastal erosions

Having briefly surveyed how some matters on maritime boundaries may be affected by coastal erosion, it may be worth to quickly mention that measures which States may then adopt to address coastal erosion must not in turn produce a counter-productive effect on the baseline. This would particularly be the case in segments of the boundary line where the normal baseline system is in use. Where the normal baseline system is used, the breadth of the territorial sea is measured with reference to the low-water line along the coast of the State.<sup>21</sup>

One measure to address coastal erosion is by building seawalls along various parts of the coasts. However, a potentially counter-productive effect on the baseline arising from the use of seawalls – or other similar techniques to address coastal erosion – is that seawalls are said to often produce a scouring of nearshore sediments by reflected waves.<sup>22</sup> While the highwater mark may be stabilised through the use of seawalls, it is said that the low-water line will, however, move landward potentially to the foot of the seawall.<sup>23</sup> There is also a practical and financial implication flowing from the use of seawalls: seawalls need to be adequately maintained. For example, in the case of Tuvalu, inadequate maintenance of seawalls is believed to have actually contributed to, rather than prevented, coastal erosion.<sup>24</sup> From a maritime boundary perspective, there may be segments of the boundary line where the coast is liable to erosion; perhaps here States can adopt straight baselines, from points unlikely to suffer erosion.<sup>25</sup>



Similarly, another measure to address the problem of coastal erosion is by using engineering structures such as groines, gabbions, and bulkheads – yet, these very measures are said to often affect the amenity and ecological value of the coast.<sup>26</sup> More importantly, some measures may even accelerate erosion on neighbouring States or may even bring a loss in biological diversity.<sup>27</sup>

Over time, normal baselines may change, as erosion can impact the location of the low-water line.<sup>28</sup> Thus, if a baseline moves there are views which advocate that the boundary moves too.<sup>29</sup> In other words, it has also been suggested that as erosion can cause a change in the physical boundary therefore along with it a change in the territorial boundary too.<sup>30</sup>

### Coastal erosion and maritime boundaries: Some further reflections and a way forward

Coastal erosion can impact stability of the shoreline – and consequently baselines used to establish maritime boundaries – whether the erosion is induced by human activities or results from natural causes such as flooding.<sup>31</sup> In this context, sediment from rivers, topography and composition of the land, and prevailing wind and weather patterns are among local factors bearing direct influence on erosion rates.<sup>32</sup> There are views which advocate that where the legal baseline may change arising from human induced expansions of the actual low-water line to seaward, the legal baseline must also change with contractions of the actual low-water line to landwards, mindful that the contractions may arise from, for example, actual loss of land through erosion.<sup>33</sup> Where such loss occurs, a broader issue surfaces: whether the State concerned may continue claiming a normal baseline from the territory that has become submerged due, for example, to erosion.<sup>34</sup> Yet, in such circumstances it may be arguable whether straight baselines alone may help overcome the problem; for, where straight baselines are anchored on coastal fronts composed of soft sediments, such straight baselines may even have to be reconstructed, as significant landward advancement may have occurred from the low-water line in the vicinity of the relevant turning points.<sup>35</sup>

The brief assessment in this article attempted to offer some insights on how coastal erosion impacts matters concerning maritime boundaries, and why measures to protect the coasts and marine environment require parallel attention alongside matters concerning maritime boundaries. Nevertheless, bridging issues between coastal erosion and maritime boundaries may have better success by leveraging on technology: remote sensing tools. Remote sensing tools may be used in various ways including mapping natural hazards. More strategically, and considering that establishing maritime boundaries warrants the interplay of different expertise, remote sensing tools can serve as a catalyst for multidisciplinary mandates to be adopted between different bodies, including for example, mapping, environmental, ecological, and geoscience agencies.<sup>36</sup>

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**Remarks:** Opinions expressed in this contribution are those of the author.



### About the Author of this Issue

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- <sup>1</sup> See further generally eg Rahman, M. H. (Dec 1984). "Delimitation of Maritime Boundaries: A Survey of Problems in the Bangladesh Case." *Asian Survey* 24(12): 1302-1317.
- <sup>2</sup> See [www.water.gov.my/activities-mainmenu-184](http://www.water.gov.my/activities-mainmenu-184) (accessed 10 March 2016).
- <sup>3</sup> National Coastal Erosion Workshop, Malaysia, Workshop 2/2015, DID, held in Kuala Lumpur on 15 October 2015.
- <sup>4</sup> See eg Powers, A. (2012-2013). "Sea-Level Rise and Its Impact on Vulnerable States: Four Examples." *Louisiana Law Review* 73: 151-173, ('Powers').
- <sup>5</sup> See eg discussion in McDonald, S. and V. Prescott (1989). "Baselines along Unstable Coasts: An Interpretation of Article 7 (2)." *Ocean Year Book* 8: 70-89 ('McDonald & Prescott'); Int. Law Association, (2012). "International Law Association Sofia Conference (2012), Baselines under the international law of the sea" *Int'l L. Ass'n Rep. Conf.* 75: 385-431 ('Sofia Conference').
- <sup>6</sup> O'Reilly, C. T., D. L. Forbes, et al. (2005). "Defining and Adapting to Coastal Hazards in Atlantic Canada: Facing the Challenge of Rising Sea Levels, Storm Surges, and Shoreline Erosion in a Changing Climate." *Ocean Year Book* 19: 189-207 ('Forbes et al'), p198.
- <sup>7</sup> bearing in mind that a shoreline is here defined as the limit which changes with the tide or water level; and that a coastline is here defined as the line that forms the boundary between the water and the land – See further Mc Graw-Hill, Dictionary of Scientific and Technical Terms, 4<sup>th</sup> ed.
- <sup>8</sup> Weil, P. (1993). Geographical Considerations in Maritime Delimitation. *International Maritime Boundaries*. J. I. Charney and L. M. Alexander, American Society of International Law: 115-130.
- <sup>9</sup> Menefee, S. P. (1990-1991). "Half Seas Over": The Impact of Sea Level Rise on International Law and Policy." *UCLA J. Envtl. L. & Pol'y* 9: 175-218 ('Menefee'), p.211.
- <sup>10</sup> Sofia Conference, above n5, p422.
- <sup>11</sup> *The Temple of Preah Vihear (Cambodia v Thailand) Merits* [1962] ICJ Rep. 6, [34].
- <sup>12</sup> Caron, D. D. (1990). "When Law Makes Climate Change Worse: Rethinking the Law of Baselines in Light of a Rising Sea Level." *Ecology Law Quarterly* 17: 621-653 ('Caron'), pp. 623, 636-641 *et seq.*
- <sup>13</sup> *Delimitation of The Maritime Boundary in the Gulf of Maine Area (Canada/United States of America)* [1984] ICJ Rep p246, [56].
- <sup>14</sup> See eg *Territorial and Maritime Dispute between Nicaragua and Honduras in the Caribbean Sea (Nicaragua v Honduras)* [2007] ICJ Rep 1 ('*Nicaragua v Honduras*'), [32]; [145], in relation to circumstances of potential basepoints at the mouth of River Coco.
- <sup>15</sup> See views of the ICJ in *Nicaragua v Honduras*, above n14, [280], [281].
- <sup>16</sup> See Dissenting Opinion, Judge *ad hoc* Torres Bernardez in *Nicaragua v Honduras*, above n14, [128]-[9]; It being noted that in drawing the delimitation line the ICJ adopted the bi-sector method.
- <sup>17</sup> See Dissenting Opinion, Judge *ad hoc* Torres Bernardez in *Nicaragua v Honduras*, above n14, [130].
- <sup>18</sup> *The United Nations Convention on The Law of the Sea*, opened for signature on 10 December 1982, 1833 UNTS 3 (entered into force 16 November 1994), (hereinafter 'LOSC'), art.14.
- <sup>19</sup> LOSC, above n18, art. 7(2).
- <sup>20</sup> See assessment in Anderson, D. H. (1993). Report No.9-2, France-Spain. *International Maritime Boundaries*. J. I. Charney and L. M. Alexander. Dordrecht, Boston, London, Martinus Nijhoff Publishers. II: 1719-1734.
- <sup>21</sup> LOSC, above n18, art.5.
- <sup>22</sup> See Menefee, above n9, p211.
- <sup>23</sup> See *ibid.*
- <sup>24</sup> See Powers, above n4, p170.
- <sup>25</sup> See Menefee, above n9, p212; See also Prescott & Mc Donald generally, above n5.
- <sup>26</sup> Gable, F. J. and S. F. Edwards (2001). "Optimal Development Setbacks for the U.S. Coastal Zone." *Ocean Year Book* 15: 299-330 ('Gable & Edwards'), p300.
- <sup>27</sup> See further eg Gable & Edwards, above n26, p304.
- <sup>28</sup> Alexander, L. M. (1982-83). "Baseline Delimitations and Maritime Boundaries." *Virg. J of International Law* 23: 503, p535.
- <sup>29</sup> See Caron, above n12, p634.
- <sup>30</sup> O'Connell, D. P. (1958). "Problems Of Australian Coastal Jurisdiction." *BYBIL* 34: 199-259, p.231.
- <sup>31</sup> See Gable & Edwards, above n29, p302.
- <sup>32</sup> Gable & Edwards, above n29, p304.
- <sup>33</sup> See Sofia Conference, above n5, p422.
- <sup>34</sup> See further discussion in Sofia Conference, p422.
- <sup>35</sup> See further Menefee, above n9, pp206-7, *et seq.*
- <sup>36</sup> See Forbes et al, above n6, p207.