SEA LEVEL CHANGE AND BASELINES

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Abstract

The discussion concerning the nature of baselines (fixed vs. ambulatory) becomes even more interesting in the light of rapid sea level change. The variability of the coastline over time is well accepted, but what would be the effect of a faster than "normal" change in a coastline. Currently there is much attention being given to predictions and reports of rising sea levels. With this, it may be an opportune time to consider the need for revising the approach to baselines and the maritime claims that begin with them. Fixed baseline coordinates may be considered nonsensical when they are submerged. While a coastal state may not be motivated to adjust baselines based on sea level rise (sea area coastward of the baseline becomes internal waters), there would be strong calls for readjustment if there were to be sea level reduction (more territory and potential extension into the sea). This study will not seek to consider causes for sea level change nor even attempt to evaluate sea level rise predictions. The discussion can be extended to all maritime zones that begin with the baseline and are established in accordance with the United Nations Convention on the Law of the Sea. Beyond a general discussion of the theoretical nature of the topic, some specific cases will be examined to show the effect of rapid sea level rise on current maritime claims.

Introduction

Much attention has been given in recent years to reports of scientific evidence that a condition of global warming is prevailing. Notable examples include the latest Intergovernmental Panel on Climate Change (IPCC) report (2007) and former Vice President Al Gore's documentary "An Inconvenient Truth," (Paramount Classics, 2006) which together were awarded the 2007 Nobel Peace Prize. Simply put, an expected outcome of the global warming is a rise in sea level. Parker (1992) states that global warming affected rise in sea level would be the result of thermal expansion of the water column and the addition of water volume due to the melting of glaciers and ice sheets. Wells and Edwards (1989 cited in Caron, 1990) estimated that global sea level rise has remained at a fairly constant rate (1.2 mm per year) over the past 100 years. However, the IPCC summary forecasts sea levels to rise 18-59 cm by the year 2100. There are other studies that predict an even greater rise in sea level (Grossman and Johnson, 2008). This rise may be considered rapid in comparison to the historic trend.

Sea level rise would have many deleterious effects upon the environment (Environmental Protection Agency, 2008). To focus on legal baselines in light of the natural effects may seem trivial to some, but the challenging scenario is one that all coastal states will need to address if these predictions come true. According to the United Nations Convention on the Law of the Sea (LOS Convention) (1982), baselines are the beginning point for maritime zones of jurisdiction.

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The present discussion can be held in light of both the normal and straight baselines, but the focus will be upon straight baselines. A point of contention, or at least difference of opinion, exists concerning the nature of baselines. Are they fixed by the establishing legislation and/or depiction on charts or are they "ambulatory" with the actual physical coastline. With the backdrop of sea level rise projections, I thought it might be useful to reconsider the nature of baselines debate.

Whether the sea level change is increasing or decreasing is irrelevant for the discussion, but the sea level rise scenario perhaps poses the greater challenge to nations in terms of how they respond. However, the reaction may depend on the view of the nature of baselines held by a particular nation. Perhaps I was naive to embark on this discussion, having proposed presenting this topic before seeing "An Inconvenient Truth" or reading Caron's (1990) call for freezing of baselines in view of rising sea levels. After eighteen years have passed since Caron's proposal, perhaps a review of the ideas presented therein is warranted.

The following background section will briefly discuss the sea level rise predictions, the background of establishing systems of baselines and the differing opinions about the nature baselines. Within the discussion portion of the paper, the baseline nature discussion will continue and incorporate specific examples of coastlines and claims from which the impact of one's position in the argument position may be seen. In conclusion, this paper will strive to encourage renewed thought and debate in light of sea level change predictions

Background

Global warming and sea level rise

Working Group I of the IPCC's Fourth Assessment Report released its Summary Report for Policymakers on February 2, 2007. One of the conclusions found therein was that sea levels might rise by 18 to 59 cm (7.08 to 23.22 in) during this century. Another conclusion is that "warming and sea level rise would continue for centuries due to the time scales associated with climate processes and feedbacks, even if greenhouse gas concentrations were to be stabilized." Grossman and Johnson (2008) noted that the IPCC estimate is considered conservative in comparison with other predictions. One example of a higher estimate is a prediction that the rise may fall within the 50-140 cm range (Rahmstorf, 2006).

This study will neither affirm nor deny the predictions of sustained global warming and sea level rise. The scientific evidence and reports of recent local changes in ice cover, coastline configuration and sea level rise vouch for themselves. However, the question that remains is whether or not the warming and sea level rise is part of a trend that will continue or is it simply part of a larger "normal" cycle? Climate records exist for only a small percentage of the time of our world's existence. We can theorize about the past, but recorded climate data are not available. The earliest sea level data records available are from the mid-1800's (Parker, 1992). Additionally, there are other considerations and opposing opinions about trends in global climate. Applying Machlup's (1962) theory of the half-life of knowledge to climatology would result in current assumptions being proven untrue within a short time. For example, it is estimated that the half-life of medical knowledge is 45 years (Lancet, 1997 cited in Sullivan, 2006). There are differing opinions about the world's climate future. The Russian scientist

Abdusamatov (2006) and others are predicting a cooling of the earth to begin within the next decade or so.

One final climate-related observation is that any discussion of sea level change must point out that sea level change is not uniform for all areas, there are great differences depending upon location. The IPCC (2007) reports that depending on the region, sea level has risen several times the global mean rise, or has actually fallen. Parker (1992) notes that the water level measured at any particular tide gauge is affected by various meteorological and oceanographic phenomena. Measurements that may be mentioned in a study of a particular area may be quite significantly different from another distant place. For example, the EPA (2008) reports that sea level rise along the US' Mid-Atlantic coast during the 20th century was 5-6 inches greater than the global average. The reports of places where changes in ice-cover and shoreline have been observed and measured seem to increase in number with each passing year. It remains to be seen whether these local changes relate to or impact a long-term global trend.

Baselines

Either sea level rise or fall could be considered in the present discussion, because the focus of the paper is the nature of baselines. For an introduction to the concept of baselines it is logical to turn to the United Nations Convention on the Law of the Sea (LOS Convention). The principles concerning baselines found therein have their origin going back to the First Law of the Sea Convention held in Geneva in 1958 and beyond to a seminal point of the Anglo-French Fisheries Convention in 1839 (Prescott and Schofield, 2005). According to Article 4 of the LOS Convention (adopted in 1982 after the work of the Third Law of the Sea Convention) the baseline is the low-water line along the coast as marked on large-scale charts recognized by the coastal state. This could be a chart that the state has produced or one released by another state. Furthermore, Article 7 of LOS Convention allows for the prescribing of straight baselines for certain coastal configurations: highly indented coastlines; the existence of a fringe of islands; and highly unstable coastlines. These categories are further restricted by guidelines within the article.

If the determination is made that the all or part of the coastline meets the qualifications as specified, a state can establish a straight line baseline system exclusively or in a mixed system with the normal baseline, respectively. For coastal states choosing to establish straight baselines, bay and/or harbour closing lines, roadsteads, and territorial sea limits, Article 16 calls for the baselines and limits to be shown on charts or be listed in a publication. This due publicity and deposit of charts with the United Nations is a crucial step in a state's fulfilment of its obligations in the establishment of its baseline system. The importance of the baseline is that a coastal state's rights to maritime jurisdiction over territorial seas, contiguous zones, the continental shelf and exclusive economic zones, are measured from these baselines (Prescott and Schofield, 2005). Because of this fact, it is the view of some (Roach and Smith, 2000; Westerman, 1988) that the adoption of straight baseline systems has been abused beyond the intent of LOS Convention. The further seaward a baseline can be constructed, the more maritime area there is to be claimed. The breadth from the baseline is fixed, but the gain is the sea area landward of the baseline and the total sea area under some type of jurisdiction controlled by the coastal state.

Both the definition of the normal baseline and the allowance for the establishment of a straight baseline system seem to indicate that the idea that under LOS Convention the baseline is not the

actual low-water line on the coast as one would observe it in nature. The previous statement is not meant to express disagreement with those who view the baseline to be ambulatory. Rather, it is the cycle of chart update and possible legislative change reflecting physical change that keeps the baseline from permanence. The fact that there is a requirement other than the actual physical coastline is logical, but also appears to establish that the publication of the coastline is a necessary part of the claim. However, Reed (2000 cited in Prescott and Schofield, 2005) indicates the some legal precedence has been set for using the actual baseline as opposed to the charted coastline. A thorough review of case history (not to be undertaken here) would be useful to see if there are additional examples of this interpretation. That viewpoint essentially yields at least three perspectives, with a possibility of a fourth, wherein the actual coastline is compared with the base points called out in a straight baseline system. Given these varying opinions on the nature of baselines, how does the discussion change, if any, in light of greater than average sea level change?

Discussion

Caron (1990) called for a re-thinking of baselines in light of a predicted rise in sea level. His arguments showed that his interpretation of proclaimed baselines was that they are not fixed. Caron's argument was that there would be great benefit from fixing baselines and the related maritime jurisdiction zones at the presently accepted position. One can wonder how arguments of this kind might be affected by the prevailing view on sea level change. Prescott and Schofield (2005) report that at least two states, UK and the Netherlands, take the view that the chart is the legal document defining the baseline. My personal opinion, as mentioned earlier, is that that by the way baselines are prescribed in LOS Convention; it is their depiction on the chart and/or the legislation declaring straight baselines that makes those the legal baselines. All hydrographers, geographers, lawyers, etc. recognize that the coastline changes over time. Perhaps part of the intent of baseline guidance is to establish some kind of permanence. But to what length of permanence should it be ascribed?

The US State Department takes a strong view that baselines are ambulatory and that the use of straight baselines has been abused (Roach and Smith, 2000). Over 30 coastal state straight baseline claims have been protested by the US for being excessive and in violation of customary international law (Table 1) (Maritime Claims Reference Manual, 2005). The US has not claimed a system of straight baselines and utilizes points along the low-water coast as depicted on charts produced by the National Atmospheric and Oceanic Administration (in tandem with closing lines as proscribed in Articles 9-12 of LOS Convention). In Westerman (1988), Reisman argues that straight baselines have been used primarily as a technique for establishing greater coastal jurisdiction over previously internationalized maritime areas. Roach and Smith (2000) and Westerman (1988) both call for stricter application of the baseline principles set forth in LOS Convention. Freezing these baselines at their current configuration, as called for by Caron, would perpetuate the excessive claims without a hope to revise them.

So how do the predictions of sea level change affect perception of the nature of baselines? If the sea levels rise, coastal states would obviously profit from leaving their baselines where they are. No doubt, there are more critical issues that a nation would have to concern itself with (flooding, economic effects, etc.) but in time the national maritime claims would need to be addressed. With the economic considerations of offshore resources and sovereignty, the subject of maritime

Country	Claim Yr.	US Protest Yr
Albania	1970; 1976; 1990	1989
Argentina	1967; 1991	1967
Bangladesh	1974	1978
Bulgaria	1951; 2000	1952
Burma	1968; 1977	1982
Cameroon	1962; 1971	1963
Canada	1967; 1987	1967
China	1958; 1996	1996
Colombia	1984	1988
Costa Rica	1988	1989
Cuba	1977	1983; 1984
Faroe Islands (Denmark)	1977	1991
Djibouti	1985	1989
Ecuador	1966; 1971	1986
Egypt	1990	1991
Haiti	1972	1973; 1989
Honduras	2000	2001
Iran	1993	1994
Italy	1978	1986
Japan	1996	1998
Korea, Republic of	1995	1999
Maldives	1996	2000, 2002
Malta	1971	1981; 1984
Mauritania	1967	1989
Mexico	1968	1969
Oman	1982	1991
Pakistan	1996	1997; 1999
Philippines	1961	1961; 1969;1986
Portugal	1985	1986
Russia	1984	1984-1987
Sudan	1970	1989
Uruguay	1998	2000
Venezuela	1968	1989
Vietnam	1982	1982; 1987

Table 1: Protested straight baselines (MCRM, 2005)

claims garners great attention throughout much of the world. Perhaps the concern over loss of land and seeking to gain offshore resources is part of the rationale behind Bangladesh's straight baseline claim (1972) that follows the 10-fathom depth contour line. Despite the fact that this type of system is in clear violation of the principles of baselines in the First Law of the Sea Convention of 1958, this nation established such a system (Figure 1).

LOS Convention Article 7 does include a provision that straight baselines utilized in an unstable coastline such as a delta may remain effective until changed. However, the points are still to be selected along the furthest seaward low-water line. If a fall in sea level were being predicted,

Figure 1: Bangladesh's Straight Baseline Claim

nations would find it highly advantageous to update baseline claims. Recognition of the ambulatory baseline would indeed be best suited for the prospects of rapidly changing sea levels and coastlines. Straight baselines systems would need to be revised, or how else would they be considered to reflect the reality of the coastal configuration? A global cooling forecast, which might lead to a fall in sea levels, might also draw more attention to the concerns about baselines along ice-bound coasts (Harsson et al, 2003; Kaye, 2004).

There are several web sites with sea level rise scenarios available on the internet. The user can adjust the amount of rise in the sea level and see the theoretical outcome graphically depicted. Two of these sites will be briefly mentioned as we begin to consider some specific locations. The University of Arizona site (Weiss and Overpeck, 2008) contains depictions of potential global changes, but contains more detailed graphics for the United States. The available range setting is from 1 m to 6 m of sea level rise. An example of a sea level rise of six meters on Florida is seen, as reproduced on the National Public Radio (2008) web site is seen in Figure 2. As the text in the graphic states, the area in red reflects the predicted inundation that would happen in several centuries, based on current predictions. The scenarios available at firetree.net from Tingle (2008) site are also worldwide in scope. The range of sea level rise is 0 m to 14 m. The inundation is not quite as obvious on this site, being indicated by grayish blue stippling. The map background is busy and the sea cover is often difficult to discern unless one zooms in closely to a small area and sets the rise value high. Notably, both viewers extend to ranges of rise that greatly exceed the near future predictions called for by the IPCC or even other less conservative estimates. This

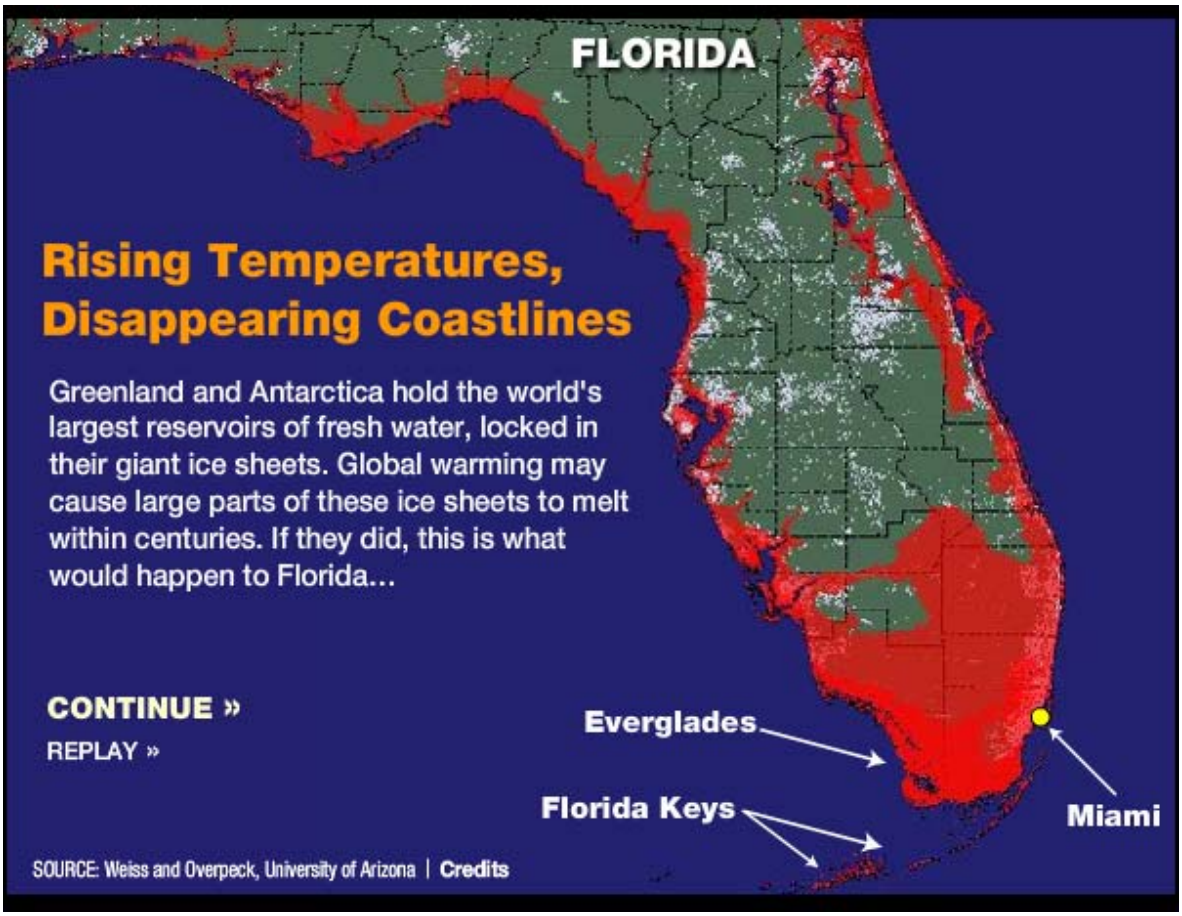

Figure 2: Florida with a sea level rise of approximately six meters (from: npr.org)

makes for a dramatic story beyond what the science estimates. This issue of scale is very important to remember. Even though the effects of lower-end sea level rise predictions will be substantial, viewed at a small scale (in map terms), the potential change doesn't appear so stark. However, once again, the point can be made that what the future holds is unknown and there are local variations of effect. Tingle does make mention of shortcomings and factors not built-in to his models in an "About" page. Next, a few specific locations will be examined as the baseline discussion is applied to real world situations.

United States

As can be seen in the sea level rise sites, drastic sea level rise would affect the US most severely in Florida (Figure 2), as well as Louisiana and in North Carolina. The evaluation of effect merely on land area is not really valid, as there are other factors including population affected and economic impact. For our discussion on baselines, however, a retreat in the shoreline results in a retreat in the baseline, which then cause a retreat in the outer limits of maritime zones. Claims are not only affected, but also negotiated maritime boundaries and commercial arrangements such as oil and gas lease blocks. Once again, the potential is there to come to a legal conflict between what is physically there and legislation and/or treaties.

Bangladesh

With a proclaimed baseline already out to sea, further sea level rise places them even further from the deltaic coastline. Kaplan (2008) examined Bangladesh's predicament, noting that 20-60% of the country is already subject to annual flooding and that a 20-centimeter rise in sea level would "be devastating to 10 million people." The delta provision that wound up in LOS Convention in 1982 was greatly beneficial to Bangladesh and other countries with deltas. However, Bangladesh has not revised its baseline to be in accordance with LOS Convention. Sea level rise for Bangladesh would be devastating to say the least, and would be detrimental to their hopes of maximizing their reach into the waters beyond the coast for a much needed economic boon. As Bangladesh seeks to reach maritime boundary agreements with its neighbors Burma and India, as well as potentially make a submission to the United Nations Commission on the Limits of the Continental Shelf, the nature of its baseline might certainly come under scrutiny. Would an additional loss in territory and further seaward placement of the currently claimed baseline negatively impact any of those maritime jurisdictional processes? The answer to that question waits to be seen.

Denmark

Denmark proclaimed a straight baseline system in 1999, amended in 2003. The low-lying nation would theoretically suffer loss of land, notably on the southwest coast of Jutland. Denmark's baselines, seaward of the largest islands fringing the coast, are perhaps then out to sea. What should the state do in response? For more prosperous industrialized nations, a matter of re-survey, re-establishment of a system may not be very problematic. In the case of Denmark, their baselines were updated only four years after the initial proclamation. The change wasn't dramatic, but there were certainly technical matters that were improved and clarified. But for many coastal states, a timely reaction would not be feasible. For those who have never met the requirements of UNLCOS, it is assumed, a rise in sea level leaves them with a retreating maritime reach. The width might be as great, but some of the new maritime territory was formerly land. Of course, so much of this is hypothetical, but it is hoped that the merits of the discussion can be seen.

Indonesia

Indonesia proclaimed archipelagic baselines in 2002. An archipelagic baseline is a type of straight baseline with additional specifications. The LOS Convention sets forth the principles for archipelagic states in Articles 46-54. The archipelagic state bears sovereignty over the archipelagic waters bound by the baselines. However, the right of innocent passage exists in archipelagic waters. Indonesia is the only archipelagic state (more than 20 have claimed this status) thus far to promulgate a system of archipelagic sea-lane passages for international navigation to transit through the archipelagic waters

Southeast Asia, already subject to tremendous physical and economic impacts caused by earthquakes and tsunamis, would also lose land to predicted sea rise. Indonesia would be one of the nations that would certainly be severely affected by a rise in sea level. During the same timeframe as the compilation of this paper, a web-log entry (Ansana, 2008) was created which mentions the effects of sea level rise on Indonesia. This archipelagic nation is currently seeking to establish an inventory of its islands (United Nations, 2007). It is believed that the greatest concern is in the relationship of the islands to the nation's maritime claims. The expectation of

sea level rise and inundation is a serious concern, as expressed in the referenced web-log. Of course, if Indonesia loses islands and territory, it reduces the base points for the construction of the baseline system from which its maritime zones originate.

The examples provided were similar in that they all have low-lying coastlines. There would naturally be differences in the effects of the sea-level rise on the different types of shoreline physiography. Low marsh or tidal flats will succumb far more quickly than areas characterized by high cliffs. Higher and less penetrable coasts will also protect lower areas landward that they protect. As mentioned earlier, the effects of any sea level rise are going to be greater or lesser depending on many factors and coastline elevation and structure is certainly an important one. A sea-level rise of x meters is not going to result in the same amount of inundation for a distance of x along all coastlines. This fact can be seen even in the generalized sea level rise simulations that are available online. The location within a country of its most susceptible areas is also a factor. In Indonesia's case, its greatest swath of low-lying land faces in and is in a sense shielded by the archipelagic baseline that it has established.

So what effect, if any, do the calls for a rise in sea levels have on any of the examples above and the rest of world? Caron viewed the situation as calling for a permanent fixing of baselines as currently claimed. Other reactions could include further refinements of the parameters for the establishment of straight baseline systems in particular. The location of a base point that is violation of the Law of the Sea principles will have more effect on the jurisdictional area gained than one that needs to be adjusted due to sea level rise. If nothing else, reaching a consensus on the nature of baseline needs to be attempted.

Conclusions

This paper was meant to simply serve as a call for further discussion on the perception of the nature of baselines in light of the predicted sea level rise over the next century. More than anything the research on this paper has been a profitable educational endeavor for me. I hope that those who know far more about the subject will be forgiving of my ignorance. Experience with maritime jurisdictions and concepts expressed in the Law of the Sea have not been around too long, so there is time to reflect and consider. How will the forecast of greater changes than experienced this past century affect the practice of states and the judgments of international law? Several views on baselines have been mentioned here and there are probably others that exist or mixtures of several that may provide a good solution. Even without acceleration in coastline modification, the issue could use further discussion and a searching for greater consensus. Perhaps with global concern over the effects of a potentially warming planet and the environmental impacts, nations can be brought together to address the issue. The few examples discussed show the effects that sea level rise might have on several coastal states. Will this affect the perception and treatment of baselines? This waits to be seen.

References

Abdusamatov, K. (2006), "Space-based solar limbograph", *Journal of Optical Technology* 73(4), pp. 242-244.

Ansana, K. (2008). Geo-political Boundaries: Global warming and the threat to sovereignty. March 26, 2008. Viewed March 27, 2008. <http:geo-boundaries.blogspot.com/2008/03/global-warming-and-threat-to.html>.

Caron, D. (1990). "When Law Makes Climate Change Worse: Rethinking the Law of Baselines in Light of a Rising Sea Level," *Ecology Law Quarterly* 17, pp. 621-653.

Environmental Protection Agency (2008). Coastal Zones and Sea Level Rise. Viewed March 20, 2008. Online at http://epa.gov/climatechange/effects/coastal/index.html.

Grossman, E. and Johnson, S. (2008). "USGS Workshop on Sea level-Rise Impacts Held in Menlo Park," *Sound Waves*, Jan/Feb, viewed 3 March 2008, <http://soundwaves.usgs.gov/2008/01/meetings.html>.

Harsson, B., Carleton, C., Macnab, R and Orheim, O. (2003). LOS Convention and Ice Edge Base Line Problems. In ABLOS,(Advisory Board on the Law of the Sea) Conference. Monaco, 28-30 October 2003.

Intergovernmental Panel on Climate Change (2007). Contribution of Working Group II to the Fourth Assessment Report: Summary for Policymakers. Viewed 1 March, 2008. < http://www.ipcc.ch/>.

Kaplan, R. (2008). "Waterworld," *Atlantic Monthly*, January/February, pp. 60-65.

Kaye, S. (2004). "Territorial Sea Baselines along Ice-Covered Coasts: International Practice and Limits of the Law of the Sea," *Ocean Development and International Law* 35, pp.75-102.

Machlup, F. (1962). *Knowledge production and distribution in the United States* Princeton, NJ: Princeton University Press.

National Public Radio (2008) website. Viewed 30 March, 2008. <http://www.npr.org/news/graphics/2008/jan/flooding/index.html>.

Paramount Classics. (2006). *An Inconvenient Truth*. [DVD]. Hollywood, 2006.

Parker, B. (1992). "Sea Level As an Indicator of Climate and Global Change," *Marine Technology Society Journal* 25. Condensed version online, viewed March 20, 2008. <http://tidesand currents.noaa.gov/sltrends/mtsparker.html>

Prescott, V. and Schofield, C. (2005). The Maritime Political Boundaries of the World. 2nd ed. Leiden: Martinus Nijhoff.

Rahmstorf, S. (2007). "A Semi-Empirical Approach to Projecting future Sea-Level Rise," Science 315, January 19, 2007. Online <http://www.sciencemag.org/cgi/content/abstract/315/5810/368/>.

Roach, J. and Smith, R. (2000). "Straight Baselines: The Need for a Universally Applied Norm," *Ocean Development and International Law* 31, pp. 47-80.

Sullivan, S. (2006). Knowledge and the Half-Life of Truth. MedHunters.com. Viewed 29 March, 2008. <medhunters.com>.

Tingle, A. (2006). Firentree.nt Flood Maps. Viewed 2 April, 2008. <http://flood.firetree.net/?ll=43.3251,-101.6015&z=13&m=7>.

United Nations Convention on the Law of the Sea (LOS Convention), UN Doc. A/CONF.62/122 (1982). The text may be found on the web site maintained by the UN Division for Ocean Affairs and the Law of the Sea http://www.un.org/Depts/los/index.htm.

United Nations Economic and Social Council (2007). Conference Paper E/CONF.98/69 Add. 1: "Office Treatment of Names of Islands in Indonesia," Ninth United Nations Conference on the Standardization of Geographical Names, 21-30 August, 2007. New York.

United States Department of Commerce (2006). ETOPO2v2c Data Set. Available online at the web site of the National Geophysical Data Center. Viewed 1 April, 2008. <http://www.ngdc.noaa.gov/mgg/global/global.html>.

United States Department of Defense (2005). DoD 2005.1-M, "Maritime Claims Reference Manual, 1 June 2005. viewed February 10, 2008. http://www.dtic.mil/whs/directives/corres/html/20051m.htm.

United States Department of State (1969). *Geographic Bulletin No. 3: Sovereignty of the Sea.* Government Printing Office, Washington.

Weiss, J and Overpeck, J (2008). Climate Change and Sea Level web site. The University of Arizona Department of Geosciences, Environmental Studies Laboratory. Viewed 16 March, 2008. http://geongrid.geo.arizona.edu/arcims/website/slrus48prvi/viewer.htm and http://www.geo.arizona.edu/dgesl/research/other/climate_change_and_sea_level/sea_level_rise/sea_level_rise_technical.htm.

Westerman, G. (1988). "Straight Baselines in International Law," Pace University School of Law Faculty Publications. <http://digitalcommons.pace.edu/lawfaculty/230>.

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