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BOOK REVIEWS

Sea Level Changes: Determination and Effects, edited by P. L. Woodworth, D. T. Pugh, J. G. DeRonde, R. G. Warrick, and J. Hannah, 1992. American Geophysical Union and International Union of Geodesy and Geophysics, Washington, D.C., 196p. (Geophysical Monograph 69; IUGG vol. 110), ISBN 0-87590-460-2, ISSN 0065-8448.

This is a high-quality "camera-ready" product, so that each article has a different typeface, which at least makes for variety. It is abundantly illustrated and even a few color plates are included. Some 21 articles deal with sea level in such diverse areas as Saudi Arabia (Red Sea coast), the Baltic, the Maldives, China, the Adriatic, Kerguelen Islands and Clipperton Atoll. Mostly, the attention is focussed on present-day mean sea level (MSL) and trends. Technology ranges from satellite altimetry and tide-gauge monitoring (GEOSAT, *etc.*) to various new procedures such as the Danish hydrostatic tube system (to achieve precise geodetic levelling across wide marine straits).

Most of the contributions are in the framework of the contemporary Global Sea Level Observing System (GLOSS), whereas geology-based long-term trends are not included except for the Red Sea item, which relied on a seismic survey, but with correlations based almost entirely on speculation and regrettably unsupported by drilling and ^{14}C dates.

An accelerated reporting system of monthly means has been developed for the North to Tropical Atlantic (ISLPP/NTA), which permits the preparation of monthly synoptic charts at close to "real time". Selected examples are rather astonishing. The largest positive MSL monthly anomaly was 65 cm for Flores (January 1982), and the largest negative one was −62.8 cm for Malin Head (April 1975). Seesaw shifts are consistent, they say, with atmospheric circulation, but we are left to guess as to when and how.

The newly created state of Croatia is to be welcomed in the authorship of the article on the Adriatic. In this low-tidal range area, the response to atmospheric pressure (the inverse-barometer effect) is dominant, but an additional forcing, presumably wind, is evident, although it is not quantitatively explored.

Another unusual site of study is Male in the Maldive Islands. The work was prompted by major flooding that occurred in April, 1987, following the broaching of a sea-wall protecting an extensive artificial-fill area. GEOSAT data confirmed that long-distance swells from the Southern Ocean near Australia played a role, but in fact seasonal-mean wave heights during the monsoon peaks (June–July) were often nearly twice as high. It was concluded that only moderate swell, but sustained for several days and with a constant direction, was responsible for the sea-wall failure. Alteration to the lagoon dynamics was also involved. The failure clearly reflected a planning deficiency and the flooding was thus probably "man-made". The author, S. A. Harangozo, sees no reason to blame it on "global warming".

A competent assessment of the global warming scenarios with respect to MSL is presented by Godfrey and Love, particularly with the Australia–Asiatic setting in mind. These regions are very much under the influence of the El Niño (ENSO) cycles which involve changes in water temperature and therefore can also affect the frequency of tropical cyclones (hurricanes). A positive SO sign and a warming trend would probably increase their frequency.

A long-term analysis of tide-gauge data from 52 stations in the tropical to subtropical Pacific (many exceeding 30 yr) by a Chinese team (Yu, Chen and Fang) brings out a very firm 47.6 month (3.9166 yr) average for the El Niño incidence, paralleled by a similar figure for sea-surface temperature. The regularity of the oscillation may help explain the complex feedback mechanisms, the El Niño phenomenon itself being only one, much-less-regular aspect of the cycle.

The 1986–1987 ENSO event was the first such

cycle to be monitored by GEOSAT satellite altimetry. A paper by Koblinsky *et al.* compares 42 oceanic island tide gauges (to avoid continental coastal bias effect, "aliasing") with the altimetry, spanning those two years. The two are comparable, with monthly variations often exceeding 6 cm, and disclosing the seasonal undulations relating to the Asiatic monsoon, the seasonal expansion and contraction of the water bodies on the west sides of mid-latitude oceans and the wind-forcing of the equatorial Pacific. The TOPEX/Poseidon Mission should, within the next decade, vastly expand our knowledge of this area.

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Coastal Dunes: Form and Process, edited by Karl Nordstrom, Norbert Psuty, and W. Carter, 1990. John Wiley & Sons, Chichester, 392p. ISBN 0-471-91842-3 ($145).

According to the publisher this is a "state-of-the-science" volume from twenty-two international contributors, dealing with parts of Australia, Britain, Ireland, United States, Canada, Israel, Japan, Poland and South Africa. A useful introduction is provided by the editors touching lightly on global distribution (with map), geomorphology and human interactions. Curiously, their map and discussion omit entirely the interesting dunes of the Arctic regions as well as those of oceanic islands, *e.g.* the Bahamas, Bermuda, the Canary Islands, St. Helena, Ascension, Hawaii—even Madagascar (!)— while they gratuitously introduce on the map three totally imaginary islands off S.E. Australia.

Section I deals with eolian transport and sedimentation, with five chapters which reflect the pioneering work of Bagnold and develop an appreciable volume of new quantitative and experimental data. Section II turns to the beach-dune interaction (chapters 6–11), with attention to such things as vegetation and spray.

Section III undertakes the more challenging problems of "secondary" dunes and dune fields. Three chapters introduce three distinctive areas with a high degree of competence: Australian examples (Help and Thom), the Polish Baltic (Borónka), and the Morro dunes of California (Orme). In each case there are examples of mid-to-late Holocene cycles of dune growth and stabilization or erosion. The first of them contains an all-too-brief review of the world's transgressive dune fields. Causality is only touched on briefly: storm-frequency, sea-level change, isostatic motions, and so on.

The final section, IV, deals with effects of human development (chapters 15 and 16) and a short consideration by the editors of directions for future research (chapter 17). This section should prove to be extremely useful to those concerned with environmental management.

The volume as a whole is well produced, with plenty of useful figures, although some were over-reduced and disclosed a lack of foresight (and/or) ruthless editorial supervision. There is an excellent index, but the publishers have regrettably set far too high a price on the volume for it to get the large sales it deserves.

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California's Coastal Hazards: A Critical Assessment of Existing Land-Use Policies and Practices, by G. B. Griggs, J. E. Pepper and M. E. Jordan, 1992. California Policy Seminar Research Report, University of California, Berkeley, 224p.

As population expansion and overdevelopment of the coastal areas increase, there is a growing awareness of the dangers incurred by occupying a dynamic zone that is subject to the forces of storms, tides and waves as well as other natural phenomena more common in California—earthquakes, tsunamis, and cliff or bluff retreat. In California, the population has more than doubled between 1950 and 1980. At present, around 80% of the population lives within 30 miles of the shore, and this proportion is expected to rise in the near future. This rapid growth has taken place during a period of relative calm in storm activity. Since then, storm frequency and severity have increased significantly. Both factors—shoreline development and climatic deterioration—have contributed to the need for a coherent coastal hazards policy.