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Extremes

Oceanography's Adventures at the Poles

Edited by Keith R. Benson and Helen M. Rozwadowski, Science History Publications, 2007, 393 pages, ISBN 0881353736, Hardcover, \$54.95 USD

REVIEWED BY JAMES P.M. SYVITSKI

Extremes is a collection of papers from the fourth Maury Workshop on the history of oceanography, held in Barrow, Alaska. From the editors' notes, and comments in the introduction by Michael Reidy, the Barrow setting made an enormous impression on the chapter authors—possibly a first polar experience for some of these historians. Over the years, hundreds of books, some outstanding, have described aspects of polar exploration, either as overviews or as personal accounts by the explorers and inhabitants. This book contributes to that growing collection, offering insights on the development of the field of polar science through the late nineteenth and twentieth centuries.

The book is not an exhaustive reflection on polar oceanography; many aspects that would appear in a scholarly textbook are left out. Important defining projects are missing or poorly described, including:

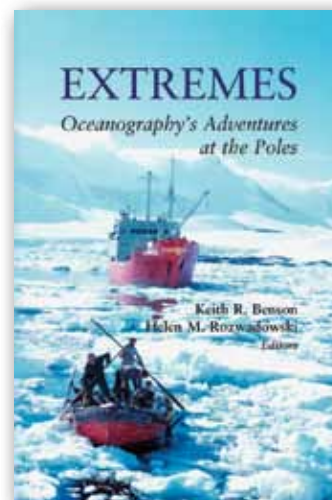
- the multinational Sedimentology of Arctic Fjords Experiment (SAFE, 1982–1987)
- the Canadian ice-island serving as a long-term floating camp for scientific parties (CEASAR, 1984–1993)
- the Dynamics of Iceberg Grounding

and Scouring experiment (DIGS, 1984–1995)

- the multinational Arctic Delta Failure Experiment (ADFEX, 1988–1991)
- scientific drilling through floating Antarctic ice shelves, through the ocean below, and deep into the seafloor (ANDRILL, 2004–present)
- the international Ocean Drilling Program, both in the Arctic and Antarctic (1980s onward)
- the U.S. Scientific Ice Expeditions (SCICEX, 1995–1999), where nuclear-powered Sturgeon-class submarines were used for unclassified oceanographic surveys to and under the Arctic Ocean
- the Arctic Monitoring and Assessment Programme (AMAP, 1991–1998), an international environment program to measure the levels and assess the effects of anthropogenic pollutants in all compartments of the Arctic environment, including radioactivity surveys dealing with sunken nuclear submarines or nuclear bombs

Polar oceanographic contributions of many countries are not discussed in any depth, including those from France, Spain, Italy, Korea, and Japan. Some chapters have less to do with oceanography as a growing field of scientific ideas, theories, and paradigms, and more to do with geopolitics and culture.

Yet, *Extremes* offers much to oceanographers. Vera Schwach resurrected the Vøringen Norwegian Expedition of 1876–1878 and its contribution to physical oceanography, meteorology, and



fisheries biology. The Vøringen expedition provides an excellent example of how natural scientists develop knowledge while “maneuvering between personal, political, and professional interests.” Cornelia Ludecke provides a credible account of German surveys of the Southern Ocean during the time of imperialism (early twentieth century). Her assessment of the role of Drygalski’s thermohaline model of Atlantic circulation, in deference to that of Brennecke’s dynamic representation and those that followed, is a wonderful account on the birth and death of scientific concepts. Eric Mills highlights George Deacon’s role in linking surface ocean circulation with deep-water formation and transport and thus the birth of the Global Ocean Conveyor Belt model. It is interesting to read how postwar anti-German sentiments in the nonscientific community may have negatively influenced the promotion of German scientists’ theories on ocean circulation. Ronald Rainger highlights Edward “Iceberg” Smith and the International Ice Patrol. Smith, taught by Helland-Hansen, learned to calculate current velocities from temper-

ature and salinity data—a most valuable contribution to the Ice Patrol.

Fae Korsmo's chapter on U.S. Arctic research early in the Cold War, along with Jacob Hamblin's chapter on the 1957–1958 International Geophysical Year, seem off topic to the oceanography theme. Peter Neushul's chapter on Antarctic marine botany is more topical, but its focus on Michael Neushul is limiting. Walter Lenz's description of the marginal ice zone experiments (POLEX, AIDJEX, MISEX) seems oddly bureaucratic. Zuoyue Wang provides a unique description on China's involvement in going to the poles, albeit with little discussion on oceanography. China wanted to use its visibility for a combination of nationalism and place in international science, along with romanticizing

its polar heroes.

Mott Greene brings the book back to its oceanography theme with a discussion on “toy” models developed by individuals to produce and run cheaply, with their emphasis on “simplicity, elegance, transparency, and excellence in classical physics.” The large climate models, he suggests, are “complex, diffuse, dense, technologically committed, expensive, and are the work of very large teams of collaborators of different ranks, exemplifying the criteria of excellence of modern industrial-scale earth science.” In Mott's theme, the toy models led to the inclusion of Arctic ice albedo feedbacks as a necessary feature of global climate models with their important implications for paleo and global-warming research.

The last chapter by Deborah Day is a

list of articles on the history of marine science in the Arctic for the twentieth and twenty-first centuries. It covers, at best, 1% of the known scientific literature on Arctic marine research, and I am not convinced it provides much value to the scientific community, although it may provide added value to polar historical research.

Extremes is, therefore, a mixed-bag survey of polar research. I am glad to have read the book, despite its unevenness.

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Waves in Oceanic and Coastal Waters

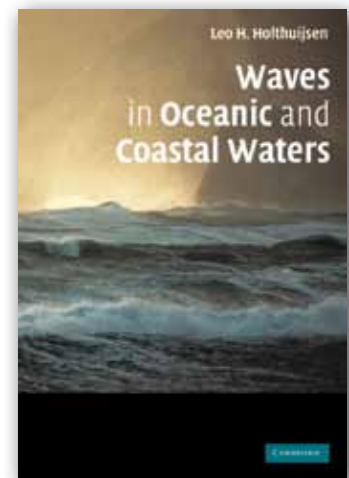
By Leo H. Holthuijsen, Cambridge University Press, 2007, 404 pages, ISBN 0521860288, Hardcover, \$80 US

REVIEWED BY STEVE ELGAR

Although few modern applications are as important as Walter Munk's wave predictions used to guide the Allied landing at Normandy, models for wind-generated ocean waves have evolved significantly since June 1944. Along with the obvious military and engineering interests, the ability to simulate waves has become a crucial component of models for coastal and nearshore circulation, and the corresponding transport of materials, includ-

ing pollutants, biota, and sediments. Oceanographers, sailors, and beachgoers have observed ocean-surface gravity waves for centuries, and mathematicians and physicists have developed exquisite theories for their generation, propagation, and dissipation for a wide range of situations. In this nicely illustrated book, Leo Holthuijsen (Delft University of Technology) reviews the observations and theories and presents the state of the art in models that simulate the generation and propagation of wind waves, especially in coastal areas.

Holthuijsen is well qualified to teach us about ocean waves. My friend and colleague Tom Herbers colorfully



describes going to sea two decades ago as Leo's student during intense storms in the North Sea to observe white caps, which are an important, but little understood, component of the momentum balance describing wave propagation.