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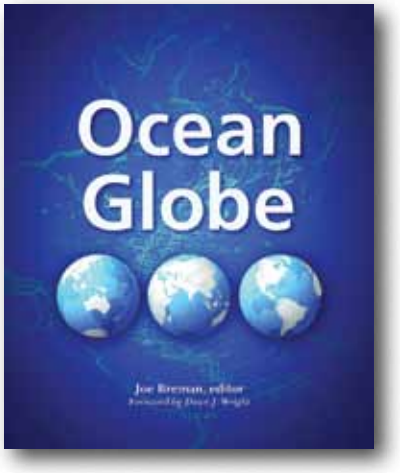
Floor for the Mapping: A Review of *Ocean Globe*



Edited by Joe Breman, ESRI Press, 2010, 294 pages, ISBN 978-1-589-48219-7, Softcover, $64.95 US

REVIEWED BY TONY J. PITCHER

Ocean Globe offers 12 chapters that focus mainly on techniques used to map the seafloor. It aims to show how GIS is being used to share information and to test hypotheses in marine ecology and conservation management. The book is edited by Joe Breman from International Underwater Explorations, which appears to be a commercial GIS business based in Hawaii. The book is published by ESRI Press, a company that has wrapped expensive tentacles around the practice of GIS worldwide (your reviewer is unashamedly a proponent of free GIS!). The many full-color illustrations are well produced, and, although an odd size on my bookshelf, the volume is attractively designed and reasonably priced.

An introductory chapter by Timothy Kearns (from ESRI) and Joe Bremen kicks off with the astounding statement that "seafloor mapping is one of the oldest professions known to humankind." Quite apart from the obvious comment about the usual designation of the oldest profession, and while there are undoubted Bronze Age sounding devices known from the archaeology of the eastern Mediterranean thalassocracies (not cited in this book; see Wachsmann, 2000), the previous 100,000 years of human history give a huge scope for this statement to be wrong. Net making, for example, is known to be at least 33,000 years old (Soffer et al., 2001), the making of fish spears is 90,000 years old (Yellen et al., 1995), and even pyramid building is 5,000 years old. Not a good start for the book! However, a neat review of the history of bathymetry by Albert Theberge at the end of the book begins more modestly in 1840. On the positive side, the opening chapter gives simple overviews of the main techniques used for mapping seafloor bathymetry: satellite altimetry using synthetic aperture radar, airplane-based lasers using Lidar, and various forms of single- and multibeam and multifrequency echosounders. Unfortunately, this chapter does not cover newer techniques using towed, low-frequency arrays such as Ocean Acoustic Waveguide Remote Sensing (Makris et al., 2010) or the use of single-beam acoustic ground discrimination systems to identify substrate types as in the widely used RoxAnn and Quester-Tangent devices (Kenny et al., 2000).

Several chapters provide further detail on the main seafloor mapping techniques and include examples of the use of seafloor maps in tsunami modeling, in managing marine protected areas, in revealing the landscapes of coral reefs, and in selecting sites for tropical prawn farms. The details of some of the chapters that interested me follow.

David Laskin, Dave Duffus, and Darren Bender write a most interesting chapter on habitat use by the 250 migratory gray whales that are summer residents of Claquot Sound, Vancouver Island. Gray whales feed by vacuuming up quantities of soft sediments and filtering small infauna such as benthic mysids, amphipods, crab larvae, and clams through their comblike baleen plates. Here, bathymetric and current data are used to develop a predictive GIS occurrence model for gray whale habitat in order to gain a better understanding of the impacts of the whales' grazing. Curiously, the model shows that many areas of prime habitat for gray whales don't have any whales. It turns out that the whale population, now almost recovered to prewhaling numbers after being hunted almost to extinction twice in the last 100 years, can easily overgraze a local area. Because benthic mysids and other food prey can take a very long time to recover, the work has important implications for coastal management of both Vancouver Island and the gray whale's arctic feeding grounds.

Green and hawksbill turtles turn out to be intimately dependent on the seafloor for mating, resting, and foraging. A chapter by Stephen Dunbar and David Howard presents a case study of bathymetry from turtle ecology projects in the Caribbean. Fitting archival and responding tags to turtles shows their spatial and temporal use of mating and feeding grounds. Although fascinating, this chapter suffers from two problems. First, it is not clear what

GIS bathymetry added to the results other than being a convenient form of mapping. Second, there is a curious mix of styles, which, for a scientist as reader, seriously detracts from the message. Clear, descriptive science text is in several places juxtaposed with irritating personalized journalese. For example, one odd section describes the work of the senior author in the third person and goes on to state how he greets a local fisherman when "the sun's already hot at 9 a.m." I found this newspaper-article style jarring, and it is surprising that the editor did not correct it.

The scientific rationale for this book is unclear. The book's foreword hypes an atmosphere of excitement about an "age of exploration" and "participatory citizen science," and we hear, rather obviously but vaguely, that the book is helping to create digital maps of the ocean and its life. (I wonder how many of these citizens will want to pony up the five grand a year for one of ESRI's GIS licences?) Each chapter aims to present a different facet of marine research that relies on ocean floor mapping for its success, but any logic behind the choice of chapters is vague and unstated. The "international" team of authors includes 23 Americans, 3 Canadians, 2 Indians, 6 French, and 4 British (the latter two nationalities all coauthors on a single chapter with more co-authors than pages). Pioneering bathymetric work in other parts of the world, notably Australia, New Zealand, and the Mediterranean is largely ignored, which is surprising, given that many of these countries have extensive government-sponsored seafloor mapping programs.

In conclusion, despite many interesting chapters, for me the book remains unsatisfactory overall. The frequent lapses into journalistic style, the arbitrary choice of authors and chapters, the incomplete coverage of major topics, and the lack of a clear overview of the conceptual basis of the science stand as significant points of criticism. There are many books and conferences focused on GIS (e.g., Wright and Barret, 2000), but the lack of coherence in this book tends to support the hypothesis that GIS is just a tool, like analysis of variance, that can be used for many things and that, not surprisingly, defies all attempts to endow it with a coherent scientific framework. Hence, I cannot recommend the book as a whole, although researchers might find it worthwhile to consult individual chapters from a library copy. Schoolteachers, however, might find the book a useful compendium as a classroom resource.

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