

Group 3 deals with tectonically stable areas where glacio-eustasy dominates the regional pattern of RSL change, exemplified here by Southeast Asia, Australia and South Africa. These case studies are particularly welcome, as there has been less direct investigation of their submerged landscape potential compared to the better studied Northwest European and Mediterranean shelves. Chapter 10 (Cawthra et al.) describes seabed mapping immediately offshore of Pinnacle Point (South Africa), an early human site dated to at least 160 ka. Like the Maltese Islands, this allows identification of submerged palaeo-landscape features and gives an impression of the palaeo-landscape around the site when it was occupied. Chapter 11 (Wurster et al.) is a critical review of the palaeo-environmental, genetic and RSL evidence for the drowned landscape of Sundaland (present-day Sunda shelf), which is used to raise questions and advance ideas on human dispersal into the region. Chapter 12 (Ward et al.) is also a critical review and covers the islands of Northwest Australia, examining RSL-driven changes in coastal configurations, ecosystems, tides and productivity which may have impacted on post-Last Glacial Maximum (LGM) human populations. Finally, Chapter 13 (Nutley et al.) departs in scale and approach from previous chapters by focusing on diver-based prospection for submerged rockshelters (potential human occupation sites) in a single embayment in Southeast Australia.

Overall, the individual chapters are generally well-written and informative. Variation between chapters occurs in terms of the level of detail and approach used. For instance, some are critical reviews aimed at generating hypotheses, identifying potential and aspiring to further research, while others are detailed presentations of field data acquisition, results and interpretation. This does work as a useful contrast and illustrates the variations in approach which are required depending on research aims, data availability or the palaeo-environmental history of the study area. It also shows well the variety of geoscientific and archaeological techniques ranging from ship-based acoustic survey and sampling through to diver-led survey and excavation.

I personally have, however, three niggling issues with this book. First, its list price of £110 (dropping to £55 with societal membership) seems rather high and off-putting to all but the most ardent researcher. Second, figure quality in the paper copy of the book is variable, ranging from very good to poor. Mostly, this is because colour diagrams have been transformed into greyscale, making them hard to interpret. Third, the book's structure means that it does not provide a true global synthesis of the state of the art. Notable omissions include the Americas, despite the potential importance of now submerged coastlines in its earliest colonization, and the North Sea, where extensive geological datasets have been absolutely critical in reconstructing the former landscape of Doggerland. For those fortunate enough to have institutional access to the Lyell Collection, the first two problems are circumvented as each chapter can be downloaded separately in full colour. Regarding the third issue, if taken alongside the other recently published volumes devoted to submerged landscapes (Benjamin et al., 2011; Evans et al., 2014), the combined trio do give an impressive illustration of subject's recent growth and the breadth of research currently ongoing across the globe.

In conclusion, this book is a useful contribution to the subject. Gratifyingly, a large proportion of the material appears new, or at least published in English for the first time. Consequently, it will certainly be of interest to geologists, archaeologists or Quaternary scientists in general. However, given the pricing/need for institutional access and the rather specialised nature of the individual chapters, it will most likely be of interest to more experienced researchers (i.e. postgraduate and above) and probably those already working on submerged landscapes.

References

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Hugues Goosse, *Climate System Dynamics and Modelling*. Cambridge University Press: Cambridge, 2015; 273 pp.: ISBN 9781107445833, £39.99 (pbk)

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The current and the future climate is subject to significant change due to the increasing human influence on the climate system. Therefore, we will need to improve our understanding of natural climate variability and trends by searching for their causes at all time scales. Model scenarios in conjunction with long-term data can be used to examine mechanisms of climate change under different boundary conditions. The book *Climate system dynamics and modelling* by Hugues Goosse provides an excellent overview of the current knowledge of the climate system. Equipped with recent examples and many figures, the book provides for an intuitive and at the same time rigorous approach for climate system dynamics. It is a well-written introductory textbook for advanced undergraduate and beginning graduate students in climate science, but it is also worth reading for PhD students or advanced scientists.

The book is organised into six chapters and starts with a concise overview of climate system components and the cycles for energy, water and carbon. Two chapters provide the basis of the Earth system including discussions of the carbon cycle and themes like the Earth's orbit around the Sun and its influence on the Earth's energy budget. Chapter 3 deals with the modelling aspects, starting from questions such as 'What is a model?' and 'What are the governing equations?' via 'How can we solve the equations by numerical schemes?' to 'How can we evaluate the models?' The beauty of this approach lies in the precise but intuitive way in which the author describes the methodologies. The response of the climate system to perturbations is explored in Chapter 4. This includes the impact of changes in composition on the radiative transfer in the atmosphere, land-use and land-cover changes, as well as solar and volcanic forcing. The concept of feedbacks is examined through theory and examples.

Chapter 5 puts climate dynamics into a longer-term context, dealing with recent changes as well as palaeoclimatic variability. This integrated approach unites all the key features of the climate system including interannual to interdecadal variability, dating of archives, as well as isotopes to explain the structure and behaviour of climate over time. The chapter gives an overview starting from the Precambrian (the first billions of years), touches on Cenozoic climate and concentrates on the climate of the last million years including the astronomical theory. The current interglacial is mentioned in two sections: mechanisms like the monsoons or forcing factors like volcanoes. The book ends with a chapter about the future climate changes and some very interesting general concluding remarks.

The particular strength of the book is the well-formulated review exercises and the general overview of the current knowledge of climate including a glossary. It is a remarkable work that will serve as a reference for years. The book is ideal for students and professionals in climate science, meteorology, oceanography, geophysics and physics because it is authoritative on a remarkably wide range of topics. Its approach is complementary to more specialised books dealing with the dynamics of the atmosphere–ocean system (Marshall and Plumb, 2007), theoretical approaches of ocean dynamics (Olbers et al., 2012) and long-term climate (Saltzman, 2002), textbooks about physics of climate (Archer, 2009 [2007]; Hartmann, 1994; Peixoto and Oort, 1992), more descriptive books such as Ruddiman (2001) or more methodological books about statistical analyses and programming of the Earth system dynamics (Chirila and Lohmann, 2015; Mudelsee, 2014; Von Storch and Zwiers, 1999).

The use of illustrative figures makes this text accessible to students with no prior training in climate, meteorology or oceanography. It includes exercises in the form of problems with model answers to help students learn the material. Finally, part of the material of the book is available online, which makes it a very useful educational tool for lectures at universities.

References

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