MASSOM, R. and D. LUBIN. 2006. *Polar remote sensing. Vol. II: Ice sheets.* Berlin, etc., Springer-Verlag; Chichester, Praxis Publishing Ltd. Published in association with the Antarctic Climate and Ecosystems Cooperative Research Centre, Hobart, Australia. 458pp. ISBN 3 540 26101 X, hardback, £102.59.

Over recent years, particularly the last decade, remote sensing has revolutionized the way we perceive the polar regions. It has opened up huge vistas of Arctic and Antarctic wilderness, the polar oceans and atmosphere, and has allowed us to study in remarkable detail the workings of the cryosphere. With this detail and scope, we now see the ice sheets not as sluggish and uniform, but as highly variable on many scales of time and space.

Massom and Lubin convey a sense of excitement at these achievements and the burgeoning potential of the field in *Polar remote sensing, vol. II: ice sheets*. This is both a review of the state of the art of polar science and a guide to the specific techniques applied to study the ice sheets. The volume is structured with an overview chapter on the global importance of Antarctica and Greenland, with particular reference to current and future mass balance; a substantial chapter on the technique of synthetic aperture radar interferometry (InSAR); and a wide-ranging third chapter that addresses the study of specific ice-sheet parameters and processes through an array of remote-sensing methods.

The authors identify InSAR as perhaps the most remarkable advance in polar remote sensing. With a whole chapter to itself, InSAR is given great prominence, but an in-depth and accessible compendium on the technique is overdue and a welcome addition to this book. It is presented at a level most suited to those with some background knowledge who are looking for an overview guide to the practical application of InSAR and its strengths and weaknesses, and to those in related fields wanting to know what the fuss is about. Each of the main processing steps is described, though InSAR practitioners would want to refer to the many referenced texts for a full treatment of the issues. As a technique for glaciology, InSAR is in something of a hiatus due to the current lack of repeated data collection over the short intervals needed to measure the flow and topography of rapidly changing surfaces, but Massom and Lubin conclude their InSAR review by discussing the emerging techniques of polarimetric interferometry, synergies with optical sensors, and by looking, in hope as well as expectation, to a near future with dedicated InSAR satellite systems and constellations.

The third of the three chapters is split thematically into sections dealing with feature mapping, surface melt analysis, iceberg detection and tracking, measurement of topography, accumulation, glacier and ice-shelf flow dynamics, ice thickness, mass balance, and surface temperature, albedo and snowpack properties. Within each section, the relevant remote-sensing techniques are described and their history reviewed. As such, techniques including thermal and passive microwave radiometry, SAR, low- and high-resolution optical sensing, feature tracking, photoclinometry, gravimetry, radar and laser altimetry are covered to the extent that readers can appreciate how, and how well, scientifically useful measurements can be made. A common theme running throughout is of looking forward to the next generation of satellite sensors, with sufficient detail on technological advances to intrigue and inspire the reader to imagine what will, fingers crossed, soon be possible.

Overall, this is a thoroughly researched and referenced overview of a broad and increasingly important field. It is positioned in time to coincide with the maturation of remote sensing as a research tool, a transition to new, much more advanced sensors, and also the widespread realization of the importance of the polar regions and the threats they face, specifically with climate change in mind. A weakness of the book, however, is its rather unbalanced structure. The two large chapters are quite different in their aims, one being a detailed study of one technique (InSAR), the other covering the application of all relevant techniques. The chapters have many subdivisions and much inter-referencing between them, leading to some repetition of information. Also, while the book is lavishly illustrated with many colour figures, these are grouped into a single plate section. These minor points and quite a dense writing style make it a somewhat difficult read as a textbook, but detract little from its value as a reference volume and teaching aid, and these criticisms are largely outweighed by the obvious enthusiasm the authors bring to the art and science of polar remote sensing. In summary, this is a useful and timely interdisciplinary work that is valuable for the updated snapshot it gives of recent advances in remote sensing, the advances in cryospheric science that these have brought, and a preview of what is to come.

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