BOOK REVIEW

PYLE, D. M., MATHER, T. A. & BIGGS, J. (eds) 2013. *Remote Sensing of Volcanoes and Volcanic Processes: Integrating Observation and Modelling*. Geological Society of London, Special Publication no. 380. Price £100.00. ISBN 978 1 862 39362 2.
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This recent offering in the Geological Society's Special Publication series is based on a William Smith Meeting held in 2011. A danger of such compilations is that by the time they appear the bleeding edge of the field has moved on and they can feel dated. Despite the technical character of the papers, this is not the case here. Three main types of remote techniques for observing volcanoes are presented: interferometric synthetic aperture radar (InSAR) for measuring the deformation of the volcano's surface from space (two papers); thermal infrared monitoring of the temperature of the ground surface (five papers); and tracking the volcanic plume of gas and ash within the atmosphere using spectrometers (four papers). Two other papers do not involve remote sensing directly. Other areas of volcano remote sensing are not represented, for example ground-based radar, acoustic monitoring and the generation of digital elevation models.

As the sub-title indicates and is explained in a useful opening summary of the field provided by the editors, the main intent of the volume is to show how remotely sensed data can be used to test quantitative models of volcanic behaviour. Most of the papers focus on observations or methods rather than demonstrating the assimilation of data into models. This is unsurprising given the rarity of quantitative models of volcanic processes driven by remote data. Three papers that do succeed in this are: the use of InSAR to test the magmatic plumbing of Nyamulagira (Wauthier *et al*.); the use of satellite thermal data to forecast large explosions at Bezymianny (van Manen *et al*.); and the use of airborne thermal data to construct models of lava dome growth at Colima (Hutchison *et al*.). Grainger *et al*.'s paper on plume and ash properties measured from space show how rapidly this field has advanced post-Eyjafjallajökull. This is the area: formal assimilation of observations into operational forecast models of atmospheric dispersion, where proper linkage of observations and models seem most likely to happen. One technique that would seem to be perfect for sensing several volcanic processes is the use of UAVs (Unmanned Airborne Vehicles) for proximal observations in dangerous locations, though the 'killer application' has yet to be found and proven. Pieri *et al*. provide a very readable overview of this topic.

This book is a valuable source of methodological detail, case histories and some inspirational ideas (Segall's paper on deformation monitoring and forecasting). Colour has been used well and the editing is tight, though I would have liked to see a glossary of remote sensing acronyms.

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