



## **Dangerous Neighbours: Volcanoes and Cities**

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## Dangerous Neighbours: Volcanoes and Cities

By Grant Heiken. Cambridge, United Kingdom: Cambridge University Press, 2013. ix + 185 pp. US\$ 30.00, £ 19.99. ISBN 978-1-107-03923-0.

Grant Heiken is a respected and experienced volcanologist whose enthusiasm and interdisciplinary interests are clearly displayed in this publication. It is well researched and well written, and acts as an important and timely account of the dangers facing large urban populations in the vicinity of active volcanoes. While the style is highly readable and sometimes colloquial, it is also precise. Facts are clearly stated, and interesting details lend the text an academic authority.

The book begins with glimpses into a number of archetypal case studies, including the 2010 eruption of Eyjafjallajökull, the 1985 eruption of Nevado del Ruiz, the 2002 eruptions of Nyiragongo, and the 1976 noneruption of La Soufriere de Guadeloupe. It then focuses in more detail on the volcanic risks in the Naples area, noting the importance of Campi Flegrei, Ischia, and Procida, as well as Vesuvius. The author's experience of visiting Naples is reflected in his account, and he also provides some interesting historical quotations about an area that has become notorious for its volcanic risk. A report from Naples concerning the 1906 eruption, for example, epitomizes a problem that is encountered by volcanologists today: many responses to volcanic crises by governments are reactive. The 1906 document uses the phrase "thrown off their guard"—which is somewhat reminiscent of the impact of the Eyjafjallajökull eruption in 2010! It is this problem—the problem of communicating a low-probability, high-impact risk—that underlies much of the commentary in the rest of the book.

The subsequent chapters comprise a range of carefully selected case studies that demonstrate not only the number of people at risk in urban areas, but also the variety of the volcanic risks that they face. Volcanic eruptions are multihazard events with distinctly local flavors. The low probability of eruptions can lead to complacency and necessitates ongoing outreach activities, often left to scientists. Heiken takes care to mention some such schemes in his case studies and highlights the importance of education in managing risk. He discusses a range of studies, focusing in particular on Naples, Mexico City, Quito, Manila, Japan (including Kagoshima and Tokyo), Auckland, Seattle, Tacoma, and Portland. He uses ancient and contemporary examples to highlight the extent of the risk faced by modern cities, drawing particularly on important eruptions such as the 1600 BCE eruption of Thera (Santorini), the 1995-present eruptions of Soufriere Hills, Montserrat, the 1991 eruption of Pinatubo, and the 1980 eruption of Mount St Helens.

The book itself serves primarily as a popular call to action. It documents the case studies clearly and effectively, in straightforward language. The final chapter directly addresses readers who live in cities close to volcanoes and provides generic advice based on the author's experience. This tries to balance the need to give advice with the recognition that eruptions vary through space and time, and that there is relatively little that can be said generically. The options that Heiken comes up with—"fight or flee"—are based on the case studies he gives, which show that city residents are sometimes able to live alongside persistently active volcanoes (such as Sakurajima in Japan) as long as activity is not of a high magnitude. The option of fleeing is difficult to contemplate in a city like Tokyo, for example.

Heiken makes a number of points throughout the book about the nature of volcanic risk, and he shows

that it is very variable geographically and at different times. The combination of a wide range of detailed case studies with the tension of an unknown future is effective in leaving the reader with a sense of the unprecedented level of risk that humanity faces from volcanic eruptions. Urbanization across the world—and particularly in developing countries with many volcanoes, such as Indonesia—has led to tightly packed populations living on the deposits of past eruptions (Donovan and Oppenheimer 2014). Volcanic risk is also affected by perceptions of the natural world—the scoria cones that litter Auckland are very different from the imposing edifice of Mount Rainier, for example. The selection of case studies is very effective in illustrating the complexity and diversity of volcanic risk.

There are aspects of the book that might cause an academic audience some frustration. A few minor inaccuracies can be pointed out (for example, the date of the Monte Nuovo eruption at Campi Flegrei is misquoted as 1548 rather than 1538 on several pages), and the sources of information are not given. Also, some parts of the final chapter are potentially controversial—such as the extent to which volcanologists make decisions (eg Donovan and Oppenheimer 2012; Marzocchi et al 2012) and the role of scientists in risk communication. These are complex issues that require collaboration between volcanologists and social scientists, and a great deal of care, as evidenced by the trial of six seismologists following the L'Aquila earthquake in 2009. Greater engagement with the disaster risk reduction literature might also have been interesting (eg Gaillard and Mercer 2013). However, the book does raise many timely and important issues, and its lack of engagement with social scientific literature does not harm its appeal as a fascinating popular book.

While this is not an academic book, it is likely to be of use to those involved in teaching geohazards at all

levels. The case studies are well chosen, and the problem is one that affects more than 100 million people. Risk from volcanic activity has never been higher, not because the volcanoes have changed, but because the population in their vicinity has increased exponentially—and continues to do so. Two things are clear from this book: first, volcanic risk, though low probability, is potentially very high impact; second, the challenge of mitigating it is complex. Relocating 100 million people is not practicable. Volcanological science continues to make progress in understanding volcanic processes and interpreting monitoring data, and this is a critical part of volcanic risk

management, but governments and populations have to make decisions about risk mitigation. In crafting this book, Grant Heiken has put together a range of examples that may be drawn from his personal experience of studying volcanoes around the world, but also point to the very essence of volcanic risk facing mankind in the twenty-first century: its urbanization.

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