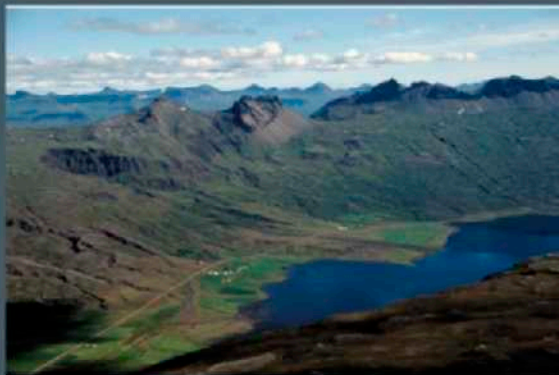


# Studies in Volcanology

The Legacy of George Walker

Edited by

T. Thordarson, S. Self, G. Larsen, S. K. Rowland and Á. Höskuldsson



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# Studies in Volcanology: The Legacy of George Walker

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# Studies in Volcanology: The Legacy of George Walker

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## Preface



George Patrick Leonard Walker 1926–2005.

This book, *Studies in Volcanology: The Legacy of George Walker*, is broadly based on presentations made at the George Walker Memorial Meeting on 12–17 June 2006, held in Reykholt, Iceland, and organized and supported by the Icelandic Institute for Earth Sciences, the Nordic Volcanology Center, IAVCEI, and the Geological Society (London). The meeting was convened by a group who had benefitted from and admired the work and tutelage of Professor George Patrick Leonard Walker, arguably the foremost volcanologist of the twentieth century and the father of modern quantitative volcanology. Most of the same group have served as editors for this volume of collected papers. We have also included several chapters submitted by colleagues and ex-students of George who could not attend the meeting and contacted the organizers after a post-meeting book announcement on Volcano Listserve.

We encouraged papers on frontier areas and challenging problems in volcanology for this volume, preferably developing some topic that George had previously studied. The majority of chapters reflect this theme. It is not the place of this Preface to describe the work of George, as that is exhaustively treated in the opening chapter by Professor R. S. J. (Steve) Sparks, but the

considerable breadth of George's interests and published work has led to a book with a wide-ranging content, broadly breaking down into three areas.

First is a group of papers on understanding the emplacement and features of lava flows, long a passion of George's. This includes a posthumous paper of his own dating from 1996 on the theme of emplacement of pahoehoe by the lava-rise (or inflation) mechanism, a topic that he began to investigate in early 1991. The unpublished manuscript for this paper has been prepared by T. Thordarson and S. Self, on behalf of the editors. The other chapters in this group include Andy Harris and Scott Rowland with a review of controls on lava flow length, Thorvaldur Thordarson and Olgeir Sigmarsson on lava flow and shield growth during the 1963–1967 activity of Surtsey, off Iceland, and Olgeir Sigmarsson, Thorvaldur Thordarson and Sveinn Jakobsson on the occurrence and development of segregation features in the Surtsey lavas.

The second group of chapters broadly falls under the category of explosive volcanism, its hazards and related volcanic phenomena. Scott Rowland, Zinzuni Jurado-Chichay, Gerald Ernst and George Walker describe their work on the violent Strombolian activity of the 1759–1774 eruption of El Jorullo, Mexico, and Julia Sable, Bruce Houghton, Colin Wilson and Rebecca Carey present a summary of eruption mechanisms during the climax of the Tarawera 1886 basaltic Plinian eruption, building on studies that George started in the 1980s. Amanda Clarke, Jeremy Phillips and Kirsten Chojnicki investigate the dynamics of Vulcanian explosions through laboratory experiments, and Lionel Wilson, with George as a co-author, presents a review of modelling eruption clouds and fall deposits. This is followed by work elucidating facies architecture of pyroclastic flow deposits using ground-penetrating radar by Nigel Cassidy, Eliza Calder, Andres Pavez and Luke Wooller; George always liked to see new techniques applied to old problems.

Geoff Wadge's contribution assesses the pyroclastic flow hazards from dome collapse at Soufrière Hills, Volcano, Montserrat, and Colin Wilson, Darren Gravley, Graham Leonard and Julie Rowland describe the timing and controls on much larger-scale silicic volcanism in the central Taupo Volcanic Zone, New Zealand, a favourite stomping ground of George's. This section is brought to a close by suggestions for a new genetic classification of collapse calderas by Joan Martí, Adeline Geyer and Arnaud Folch, building upon work that George began in the 1980s.



The third and last group of chapters concerns aspects of the infrastructure of volcanic provinces and processes in volcanoes and includes a thought-provoking treatment of volcanic systems by Edgardo Cañón-Tapia. This is a topic that George was actively working upon with the author until near the time of his death and that develops ideas expressed in George's 1993 paper on the same theme. Following is a review of current knowledge of volcanology of large igneous provinces by James White, Scott Bryan, Pierre-Simon Ross, Steve Self and Thorvaldur Thordarson, a topic on which George also published one of the first papers, following his 1960s visit to the Deccan Traps. The final three chapters are on George's beloved Iceland, where he did much fundamental work. Árni Hjartarson's contribution uses central volcanoes as indicators of plate spreading rates in Iceland, Agust Gudmundsson, Nadine Friese, Ruth Andrew, Sonja Philipp, Gabriele Ertl and Ludovic Letourneur examine the effects of dyke emplacement and plate pull on volcanic systems and central volcanoes, and Steffi Burchardt and Agust Gudmundsson describe the structure of Geitafell Volcano. The final chapter of the book is a pictorial summary of George's life and work compiled by Scott Rowland and Steve Sparks.

The editors sincerely thank the authors for their contributions to this volume and for their

patience during its preparation. We also owe a debt of gratitude to the reviewers for all the chapters, including Stephen Blake, Rebecca Carey, Amanda Clarke, Jonathan Dehn, Sarah Fagents, Godfrey Fitton, Michael Garcia, Agust Gudmundsson, Magnus T. Gudmundsson, Christopher Hamilton, Stephanie Ingle, Jim Kauahikaua, Andrew Kerr, Jan Lindsay, Peter Lipman, Ian Main, Joan Marti, Jocelyn McPhie, David Pyle, Kelly Russell, Steve Sparks, Brian Upton, Benjamin van Wyk de Vries, Lionel Wilson, Colin Wilson and Bernt Zimanowski. Special thanks go to Angharad Hills and staff at the Geological Society of London Publishing house, and to Dr Grant Heiken, representing the Special Publications of IAVCEI, who also acted as executive editor for the entire volume and provided valuable suggestions. Finally, the editors thank, and dedicate this book to, Mrs Hazel Walker and Alison Walker, George's wife and daughter, who have supported activities and fund raising opportunities under the IAVCEI banner (for example, the Walker Prize) to perpetuate the memory of George and his outstanding contributions to modern volcanology.

THE EDITORS  
*October 2008*