Cities on Volcanoes 9
November 20-25, 2016
Puerto Varas, Chile
'Understanding volcanoes and society: the key for risk mitigatio

Validation of a new protocol for assessing hazards of leachable elements in volcanic ashfall through an interlaboratory comparison exercise

Carol Stewart[1], Claire J. Horwell[2], Ines Tomasek[2], Maria Aurora Armienta[3], Maria Gabriela Ruiz Hinojosa[4], Pierre Delmelle[4], Shane Cronin[5], Moya Appleby[6], Chris Ottley[2], Geoff Plumlee[7], David E. Damby[8]

[1] Joint Centre for Disaster Research, GNS Science/Massey University, New Zealand
[2] Durham University, England
[3] UNAM, Mexico
[4] Université catholique de Louvain, Belgium
[5] University of Auckland, New Zealand
[6] GNS Science, Wairakei, New Zealand
[7] US Geological Survey National Center, Reston, Virginia, USA
[8] US Geological Survey, Menlo Park, California, USA

Keywords: hazard assessment, volcanic ashfall, leachable elements, validation, protocol

Volcanic ash is the most frequent, and often widespread, volcanic hazard and is produced by all explosive volcanic eruptions. Complex interactions between primary gases and mineral surfaces in fragmenting magma lead to the presence of readily-soluble salts on ash surfaces which may be released upon contact with water or body fluids. Following an eruption, the public, civil authorities and agricultural producers will often have major concerns about the effects of volcanic ash on human and animal health, drinking water supplies, crops, soils and surface runoff. As part of the immediate emergency response, there should be rapid dissemination of information about the physical and chemical properties of the ash and its hazardous potential. However, methods to characterise leachable elements have varied substantially among studies, leading to a lack of comparability. To address problems with lack of clarity about appropriate methods for hazard assessment and lack of comparability among studies, a two-day workshop was held at Durham University, England, in June 2011, hosted by the International Volcanic Health Hazard Network (www.ivhhn.org). The outcome of this workshop was a 'consensus protocol' for analysis of volcanic ash samples for assessment of hazards from leachable elements, which was subsequently ratified by leading volcanological organisations. The purpose of this protocol was to recommend clear, standard and reliable methods for the rapid assessment of hazards from leachable elements, applicable to a range of purposes such as assessing impacts on drinking-water supplies and ingestion hazards to livestock. To validate these methods, a bulk sample of pristine ash was subdivided and distributed to five participating laboratories worldwide. Each laboratory independently analysed ash subsamples for a wide range of constituents. Results have been collated and analysed, and preliminary findings indicate good comparability for most constituents, thus indicating that the development of this protocol is a useful step towards providing standardised and reliable methods for ash hazard characterisation.