

Phase 1

Sample collection

Ash samples supplied or collected

Sample preparation

(oven drying < 90°C, sieving through 2 mm and 1 mm meshes¹, sub-sampling)

Phase 2

Rapid analysis and Dissemination

Grain size analysis (laser diffraction¹)

Disseminate results on quantity of respirable and thoracic material

No respirable material
(<1% <4µm or <2% <10 µm)

No further analyses

Phase 3

Detailed analysis

Bulk composition analysis
(major elements – XRF²)

If SiO₂ portion is >52 wt. %
(i.e. not basaltic)

Particle shape analysis
(SEM² & TEM³)

Crystalline silica quantification (XRD-PSD⁴)
of cristobalite, quartz, tridymite

Leachate analysis
(ICP-MS/AES or IC⁵)

Surface area analysis
(BET⁶)

Surface reactivity (EPR⁶)
& Oxidative capacity²

In vitro toxicology
(haemolysis²)

If ash is fine, reactive,
contains high silica

Report

Phase 4

Report

References for methods

- ¹ C.J. Horwell, J. Environmental Monitoring, 9(10), 1107 - 1115, 2007.
- ² J.S. Le Blond, C.J. Horwell, P.J. Baxter, et al., Bulletin of Volcanology, In press.
- ³ M. Reich, A. Zúñiga, A. Amigo, G. et al. Geology 37, 435-438, 2009.
- ⁴ J.S. Le Blond, G. Cressey, C.J. Horwell and B.J. Williamson, Powder Diffraction 24, 17-23, 2009.
- ⁵ C.S. Witham, C. Oppenheimer and C.J. Horwell, Journal of Volcanology and Geothermal Research 141, 299-326, 2005.
- ⁶ C.J. Horwell, I. Fenoglio and B. Fubini, Earth and Planetary Science Letters 261(3-4), 662-669, 2007.