The International Volcanic Health Hazard Network

www.ivhhn.org
The International Volcanic Health Hazard Network

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Aka ... IVHNN, IVNHH, INVHH ... (GVM Briefing Document ;-)
• Umbrella organization for all volcanic health-related work
• Founded in 2003
• Main aims:
  – Facilitate volcanic health research and education
  – Portal for public information during crises
  – Repository of data, guidelines and expertise
  – Forum for discussion
• 31 ‘expert’ members; ~200 ‘corresponding’ members
• Website visited by ~ 3000 unique visitors per month
IVHHN - The International Volcanic Health Hazard Network

The International Volcanic Health Hazard Network (IVHHN) is an umbrella organisation for all research and information on volcanic health hazards. IVHHN currently involves 31 expert members from 25 international institutions as well as corresponding members who are signed up to the mailing list. Expert members of IVHHN work in diverse scientific disciplines such as volcanology, epidemiology, toxicology, public health and physical chemistry with a common aim of trying to determine the health effects of volcanic emissions. IVHHN was launched in 2003 and is an IAVCEI Commission.

Breaking News

Iceland Eruption

The UK Health Protection Agency have released a statement on the health hazard which can be viewed on their website. Please also see the health advice from Health Protection Scotland at: www.hps.scot.nhs.uk/news/spdetaile.aspx

www.ivhhn.org
Guidelines and databases

For scientists:
• Protocol for analysis of ash samples
• Protocol for grain-size distribution analyses
• Ash collection procedures
• Volcanic ash leachate database

For public, hazard/health agencies, NGOs, governments & scientists:
• Volcanic gas & particulate guidelines (including standards)
• Recommended dust masks
• Preparedness for ashfall
• The health hazards of volcanic ash

Available as pamphlets in 9 languages
Assessment of respiratory health hazard carried out at ~11 volcanoes since 2008.

GVM input ... Capacity to anticipate consequences of future volcanism
Location of volcanoes studied

- Eruption crisis
- Archive samples
- Full studies
- Single sample/analysis
GVM input … Data?

- Assessment of respiratory health hazard carried out at ~ 11 volcanoes since 2008.
- According to protocol for mineralogical and toxicological analyses.
Protocol for analysis of bulk ash samples for health hazard assessment

Phase 1
Sample collection

Ash samples supplied or collected
Sample preparation
(oven drying < 90°C, sieving through 2 mm and 1 mm meshes, sub-sampling)

Phase 2
Rapid analysis and Dissemination

Grain size analysis
(laser diffraction\(^1\))
Disseminate results on quantity of respirable and thoracic material

Respirable material
(<1% <4 μm or <2% <10 μm)
No further analyses

Phase 3
Detailed analysis

Chemico-physical properties

Bulk composition
(major elements – XRF\(^2\))
Particle shape & composition
(SEM\(^2\) & TEM\(^3\) with EDS)
Surface area
(BET\(^6\))
Leachates
(ICP-MS\(^5\))

Surface reactivity

Hydroxyl radical generation
(EPR\(^7\))
Iron release
(UV-Vis\(^8\))
Depletion of antioxidant defenses
(UV-Vis\(^8\))

Crystalline silica quantification of cristobalite, quartz, tridymite
(XRD-PSD\(^4\))

if SiO\(_2\) portion is >52 wt. % (i.e. not basaltic)

In vitro toxicology
(haemolysis, cytotoxicity and inflammation tests)

if ash is fine, reactive or contains high silica

Phase 4
Report

Report
GVM input ...
Capacity to anticipate consequences of future volcanism

- Assessment of respiratory health hazard carried out at ~ 11 volcanoes since 2008.
- According to protocol for mineralogical and toxicological analyses.
- Large dataset gathered.
## (Draft) summary table for HPA

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<th>GRAIN SIZE</th>
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GVM input ...

Capacity to anticipate consequences of future volcanism

- Assessment of respiratory health hazard carried out at ~ 11 volcanoes since 2008.
- According to protocol for mineralogical and toxicological analyses.
- Large dataset gathered.
- Allowing predictions of likely health outcomes without medical studies.
Reporting of data

- Reports direct to hazard managers/agencies/NGOs
- Reports on website

**Academic publications:**

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• Assessment of respiratory health hazard carried out at ~ 11 volcanoes since 2008.

• According to protocol for mineralogical and toxicological analyses.

• Large dataset gathered.

• Allowing predictions of likely health outcomes without medical studies.

• Could predict hazard from eruption style alone ... but more work needed ... How?
IVHHN funding

• 2003-2006 UK Leverhulme Trust
• 2007-2010 UK Royal Commission for the Exhibition of 1851
• 2011 Institute of Hazard, Risk & Resilience (Durham)

• Urgency studies:
  – 2 funded by NERC
  – 1 funded by WHO (no staff costs)
  – Partial funding from:
    • Durham University
    • PhD/MSc research funds
    • IVHHN/Personal funds
    • Free lab. time ...