

‘Plumerang’ health risk¹

Scientists have discovered that significant changes can occur in the composition of volcanic eruptive plumes whilst circulating high above the atmosphere. Nicknamed ‘plumerangs’, the evolution of such plumes represent a previously unappreciated health hazard.

Icelanders were subjected to at least 18 days of undetected air pollution during the six-month long eruption of the Holuhraun lava field between 2014 and 2015, one of the most intense and widespread volcanic air pollution events in centuries.

Eruptive plumes of gas and aerosol particulates from volcanoes, which can be blasted tens of kilometers through the atmosphere and circulated over vast areas of the globe, are a well-known pollution hazard to life and the environment. The chemical and physical makeup of such plumes impacts air quality and climate in general, and, as a consequence, the health of humans and potentially any other living organism in both terrestrial and aquatic environments with which they come in contact.

Cambridge scientists, including Dr Marie Edmonds of the Department of Earth Sciences, have contributed to new research, which has revealed this previously unknown health risk. Analysis of the recent Icelandic fissure eruption has shown that composition of individual volcanic plumes can evolve whilst they circulate above the atmosphere.

High levels of sulphur dioxide (SO₂) gas were recorded and the population duly warned during the eruption. But what was not appreciated at the time was the gas to aerosol conversion, which took place in the plume whilst circulating above the atmosphere. Consequently, the population was not warned about the fine particulates of the aerosol contained high concentrations of sulphuric acid and traces of heavy metals normally found in human-made air pollution, all of which are linked to negative health effects.

The small particles found by the scientists could penetrate deep into the lungs and exacerbate asthma attacks. They estimate that exposure to such particles could cause more than three million premature deaths a year.

On at least 18 days during the six month eruption, the toxic ‘plumerang’ circulated over the city of Reykjavik, whilst the official forecast showed ‘no plume’. Hopefully, the research will lead to better monitoring and revision of the European Commission air quality standards.

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