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Social media: A fast-paced, on-demand communication tool that can help people make informed decisions during a crisis.

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At 10:45 p.m. on November 27, 2022, an earthquake swarm beneath Mauna Loa triggered alarms at the U.S. Geological Survey Hawaiian Volcano Observatory. Within the hour, lava breached the surface of the summit caldera. During the eruption, @USGSVolcanoes social media was an essential tool to convey information and dispel misinformation as conditions rapidly evolved at Earth's largest active volcano.

Lessons from recent eruptions at Mauna Loa and Kīlauea demonstrate that social media is essential for communicating official messages about volcanic events. Posts include USGS notifications of activity, field photos and videos, and maps showing lava flows relative to critical infrastructure. Hazard messaging describes health and safety threats, such as exposure to volcanic gases, and actions the public can take to protect themselves. Through coordinated social media campaigns, USGS Volcanoes and partner agencies responsible for emergency alerts, closures, and evacuations amplify each other's messaging to reach a broad audience.

In contrast to other media sources, USGS Volcanoes social media channels provide non-sensationalized situational awareness, facts, and guidance for protective measures. The USGS Volcanoes social media team uses social sensing (assessing social media trends about eruptions) and receives questions and input from followers that feed into further information releases through official notifications, website updates, and additional social media content. This fast-paced on-demand communication tool helps people make informed decisions during a crisis.

ID: 222

KAIROS AI-digital solution for predicting adverse sulphur clouds impacting airspace operations

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Aviation and the atmosphere are intrinsically linked. A good understanding of the meteorological processes is essential for the safety of passengers. Several key aspects of the atmosphere continue to challenge aviation operations, i.e., severe weather, space weather, and natural airborne hazards. In this work we focus on the impact of volcanic eruptions on aviation due to volcanic SO_2 dispersion in the atmosphere.

After describing the potential aircraft damage which can occur by flying through a volcanic plume (from SO_2-rich eruptions, continuous degassing or anthropogenic emitters), this work aims at improving the quality of SO_2 clouds information provided to the aviation community by using artificial intelligence (AI). Our system develops its algorithm by considering data archives (several months) and near-real-time (time delivery from 10 minutes to 3 hours) data inputs. Using the state of the art of SO_2 observations from geostationary (GEO) and low earth orbit (LEO) satellite sensors operating in the ultraviolet and infrared spectral range, the goal of KAIROS system is to provide aviation stakeholders with precise digital SO_2-forecasts at longer lead times compatible with decision support tools allowing them to mitigate the impacts of volcanic clouds on their operation. By providing accurate AI-based SO_2 forecasts earlier in the air traffic flow management process, aviation stakeholders will be able to formulate strategies to minimise the disruption to their operations. On the other hand, forecasting SO_2 transport in the surroundings of volcanoes is essential to mitigate the health impact on population. This can benefit to civil protection and political agencies.

ID: 244

A Timeline for Volcanic Eruption and Response Coordination

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Volcanic unrest and eruptions are times of high potential uncertainty, where situations can rapidly change. One certainty during these times, is that massive quantities of information will be arriving, from a variety of sources. In order to maximize the ability of responders in impacted and potentially-impacted areas to ensure they have the information they need, it is critical to provide details on from where information will be coming, from which sources, which formats it will arrive in, and roughly how long it will take to arrive. To this end, Washington Emergency Management Divison has worked together with science and response partners to create a volcano response "Timeline," focusing on these details. We present what is included in this "living document," and how it can be used and updated, and how it may be used as a tool in exercises and drills to identify communication gaps.

ID: 300

Comparación de las escalas temporales de erupción y evacuación en el Volcán de Fuego (Guatemala) para una mejor comprensión del riesgo

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Durante las crisis volcánicas, la mitigación de riesgos exige que las partes interesadas respondan con rapidez. Pero, ¿en qué plazos evolucionan las erupciones? ¿Y cómo se relacionan estas escalas de tiempo con las respuestas de las partes interesadas? Estudiamos estas cuestiones comparando las escalas temporales de las erupciones y evacuaciones del Volcán de Fuego (Guatemala), para identificar los desfases en la evacuación y explorar sus causas. Analizamos datos geofísicos de erupciones en 2012 - 2018 para restringir las escalas de tiempo de las erupciones. Simultáneamente, determinamos las escalas de tiempo de respuesta a través de entrevistas con las partes interesadas. A continuación, comparamos las escalas de tiempo de erupción y respuesta para explorar los factores que impulsan la toma de decisiones. Encontramos que las escalas de tiempo de erupción y respuesta son comparables, pero que la respuesta comienza mucho después del inicio eruptivo, por lo que la respuesta a menudo se produce durante el clímax eruptivo cuando el riesgo es mayor. Usamos líneas de tiempo emparejadas para dilucidar los factores clave de este retraso y mostramos que los tiempos de respuesta podrían mejorarse con medios acordados entre partes interesadas. Consideramos que nuestro análisis puede ser útil para las partes interesadas que trabajan para mitigar el riesgo en Fuego, centrándonos en cómo pueden satisfacerse las necesidades de una comunidad para que, durante una crisis eruptiva, pueda evacuar a tiempo. Este análisis ofrece ideas prácticas para personas que trabajan para mitigar el riesgo asociado con volcanes activos en todo el mundo.

ID: 709

Raising the alert level at a caldera: the 2022-2023 unrest episode at Taupō volcano, Aotearoa New Zealand

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In September 2022, we raised the volcanic alert level at Taupō caldera. This was the first time in New Zealand's history and - from what we can gather - worldwide, that the alert level was raised for a caldera. A few months later, a significant, widely felt, earthquake beneath Lake Taupō caused minor damage to local properties, landslides and tsunami on the lake, raising the level of concern about the activity at Taupō caldera. It was also the first time in our monitoring history that we responded to a significant event across four perils (volcano, earthquake, landslide and tsunami).
In this presentation, we go through why and how we changed the alert level at Taupō caldera and, most importantly, what steps were taken to successfully communicate and manage this unrest with key stakeholders. We touch on the importance of strong stakeholder relationships, nurtured between crises, and the power of a coordinated, simple and fit-for-purpose narrative using a range of medium. Finally, we draw some lessons learned for managing potentially difficult situations that can be extended to other volcanoes worldwide.

ID: 57

The development of the new Daily Volcanic Activity Report: an update and call for community input and discussion

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The U.S. Agency for International Development's Bureau for Humanitarian Assistance (USAID/BHA), the USAID-U.S. Geological Survey Volcano Disaster Assistance Program (VDAP), and the Smithsonian Global Volcanism Program (GVP) have partnered to produce a new Daily Volcanic Activity Report (DVAR). The team is currently developing strategies for a) extracting daily volcanic event information from primary sources, including volcano observatories, civil protection/emergency management, volcanic ash advisory centers, and social media; b) populating the data in a database that includes alert levels; and c) producing short, daily volcanic activity narratives. The DVAR will be published on the GVP website and will support event chronology databases, such as GVP's Volcanoes of the World and VDAP's global Eruption Chronology (E-chron).

The daily collation and distribution of worldwide volcanic activity data in a short, narrative format provides more timely updates for situational awareness during volcanic unrest and crises. It will complement the monthly GVP Bulletin and USGS-GVP Weekly Reports and directly benefit humanitarian organizations, emergency responders, and the public among others. This product promotes international collaboration by encouraging and strengthening open communication between agencies and partners. Volcanoes with new or increasing unrest, new eruptions, or eruptions with humanitarian impacts are highlighted in the DVAR. We are seeking feedback on the content, formatting, and delivery structure of the DVAR to help us design a product that best serves potential partners and users.

ID: 181

Understanding rhythms: The role of social and volcanic temporalities in risk communication

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Latin American societies coexist with volcanic forces that have shaped the Earth's surface and made it habitable. Although some eruptions force populations to leave temporarily, humans persistently choose to reoccupy volcanic territories. Understanding how these forces interact with human responses at multiple scales (i.e., from individual, household to land-use planning and during and after an eruption) requires reflecting on social rhythms that shape settlement patterns, identities and livelihoods rooted in volcanic lands. At the same time, these scales are related to structural vulnerabilities that shape risks, which materialise in the short or long term depending on the different eruptive rhythms. This raises the question of how social and volcanic temporalities mutually influence one another, as well as that of why communicating disaster risk at each rhythm matters. This paper reflects on this interrelation, using three illustrative Chilean cases (Calbuco, Villarrica and Lonquimay volcanoes, based on literature review and primary data) to understand the relevance of communicating risk according to the different needs and tempos of everyday life of people and volcanic crises. In doing so it further seeks to visualise the volcano as an agent around which different human temporalities converge with different learnings for disaster preparedness.