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On the use of dense seismo-acoustic network to provide timely early warning of volcanic eruptions

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The Stromboli volcano is known for its persistent explosive activity, with hundreds of explosions every day ejecting ash and scoria up to heights of several hundreds of meters. Such a mild activity is however punctuated by lava flows and major explosions that represent a much larger hazard. On July 3 and August 28 2019, two paroxysmal explosions occurred at Stromboli, generating an eruptive column that quickly rose up to 5 km. Due to an absence of notification of the eruption, the Toulouse Volcanic Ash Advisory Center (VAAC) emitted an advisory to the civil aviation with a two-hour delay. The various processes of this event were monitored by infrasonic arrays up to distance of 3700 km and by the Italian national seismic network at range of hundreds of kilometres. Using state-of-the-art propagation modeling, we identify the various seismic and infrasound phases for precise timing of the eruptions and volcanic source characterization. Integrating national seismo-acoustic stations to the global infrasound International Monitoring System network opens new perspectives in volcano monitoring for hazard assessment by providing timely early warning of large eruptions.

Promotional text

Many volcanoes worldwide are poorly monitored. Explosive eruptions produce infrasound that are detected at thousands of kilometers. The use of dense seismo-acoustic networks could provide timely reliable source information of these eruptions to Volcanic Ash Advisory Centers.

Primary authors: Mr LE PICHON, Alexis (Commissariat à l'énergie atomique et aux énergies alternatives (CEA), France); Mr PILGER, Christoph (Federal Institute for Geosciences and Natural Resources (BGR), Hannover, Germany); Mr CERANNA, Lars (Federal Institute for Geosciences and Natural Resources (BGR), Hannover, Germany); Ms SOUTY, Viviane (Commissariat à l'énergie atomique et aux énergies alternatives (CEA), France); Mr MAZET-ROUX, Gilles (Commissariat à l'énergie atomique et aux énergies alternatives (CEA), France); Mr VERGOZ, Julien (Commissariat à l'énergie atomique et aux énergies alternatives (CEA), France); Mr HERNANDEZ, Bruno (Commissariat à l'énergie atomique et aux énergies alternatives (CEA), France); Mr LISTOWSKI, Constantino (Commissariat à l'énergie atomique et aux énergies alternatives (CEA), France); Mr MARCHETTI, Emanuele (University of Firenze, Department of Earth Sciences, Firenze, Italy); Mr HEREIL, Philippe (Meteo-France, Toulouse, France)

Presenter: Mr LE PICHON, Alexis (Commissariat à l'énergie atomique et aux énergies alternatives (CEA), France)

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