

## **Noble gas evolution in submarine volcanoes: New forecasting perspectives**

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The gases emission, from the geochemical point of view, is the first sign directly related to the beginning of a volcanic event. Seismic tremors are usually the equivalent signals from the geophysical perspective. In both cases, these signals are from an eruption that has already started and for which, often, the reaction time of society is too short (see for instance the recent tragical episode on September 2014, at Mount Ontake).

Volcanism on Earth is predominantly submarine, and despite the existence of important physical and geochemical research about it, this is mainly focussed on the seawater-rock interactions when the eruption was underway. We have applied noble gases (He, Ne and Ar), inert and little affected by chemical or recycling processes in the inner Earth, to study degassification processes, from melt and fluid inclusions to the sink, in several worldwide submarine volcanoes (Spain, Japan, Antarctica).

Results revealed the potential to be a powerful tool to assess their geochemical evolution from the mantle source -once the eruption is triggered (?)-, to the surface before the eruption is already inevitable. This novel forecasting indication may help to constrain the arrival time of a subaqueous eruption that in turn, offers an invaluable extra time for a more efficient reaction of society.