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Carbon and sulfur isotopic study of some Japanese and Italian volcanic gases

The study of fumarolic gases offer the opportunity to know more about how volcanoes work. The possibility to know more about the isotopic composition of some species give the chance to understand the genesis of these gases, and/or with which source/s have interacted before the arrival of the gas at the surface. Samples collected in different volcanic areas, from Japan on Kirishima volcano, at Vulcano island in Italy and in Indonesia on Java volcanoes have been analysed to know their content in C and S. Few more carbonatitic rock samples have also been analysed for their C content.

The purpose to know their isotopic value is to try to define the extension of the volcanic system at Kirishima volcano and its interactions with local surficial geothermal system. At Vulcano island on the other hand, the continuous variation with time of the content sulphur species - SO₂ and H₂S - but also CO₂ has rised questions about the existence of different sources at different depths beneath the volcano. The isotopic analysis of H₂S and SO₂ (S) and CO₂ (C) simultaneously on the same samples may answer to this question. The isotopic content of S can also allow to know if the source/s at Vulcano island have changed in the recent years as it has been suggested by several authors. This result may have a serious implication for the surveillance and monitoring of the volcanic activity of the island. Data obtained have not yet ben interpreted, but at least for C they seem to be in the range of typical MORB value in agreement with carbon data usually obtained on Japanese volcanic areas.

For the first time a large set of gas samples from Indonesian volcanoes have been sampled. The goal is to try to have a base line value for S (as well for C) for Java volcanoes and to couple these isotopic data with those already obtained from noble gases. One of the object of this study is to try to understand which is the role played by the subducting plate and its nature from the isotopic content we have found. Carbon data are entirely magmatic, in the range of the MORB value. Sulphur data needs further review, although it seems that a certain shift from typical S value (0%) exists.

The last samples analysed are some rock samples from the newly discovered carbonatic volcanic region in Italy. It is the first time that some C analysis have been performed. The data obtained show an extremely light carbon, very different from typical carbonate values (0%), and in the upper range of the MORB for two samples. The other values, lighter, until -11%, may originates from surface contamination. However, these data definetely need a further review."