

Sulphur isotopic composition of volcanic gases from Poás and Turrialba volcanoes, Costa Rica

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Poás and Turrialba are active volcanoes located in the Central America Volcanic Range, Costa Rica. The Turrialba volcano is a 3340 m high basaltic-dacitic stratovolcano that in the southwest end of has a summit depression with three craters. The Poás is 2700 m with three calderas and an crater bordered by two cones.

Fumarolic gases were collected from the west crater of the Turrialba volcano, at 70-278°C, between August 2004 and August 2009. And in the Poás, at 93-200°C, between June 2009 and May 2009. A characterization of these gases has been previously reported [1]. Here The $\delta^{34}\text{S}$ values of dissolved, H_2S and SO_2 and total sulphur were determined.

In the Turrialba volcanic gas the H_2S content increases with the temperature and $\delta^{34}\text{S}$ values of total sulphur range between +3.1 and +7.5‰. In the Poás The $\text{SO}_2/\text{H}_2\text{O}$ ratio decreases with the temperature and $\delta^{34}\text{S}$ values are from -3.1 to +4.5 ‰. This composition is consistent with that of other total sulphur of volcanic gases, with some values heavier than the mantle sulphur.

In the Poás, there is a negative correlation between $\delta^{34}\text{S}_{\text{H}_2\text{S}}$ values (-15.2 to -8.2‰) and $\delta^{34}\text{S}_{\text{SO}_2}$ values (+1.2 to +9.0‰) whereas in the Turrialba $\delta^{34}\text{S}_{\text{H}_2\text{S}}$ values (-23.2 to -8‰) and $\delta^{34}\text{S}_{\text{SO}_2}$ values (+5.2 to +12.4‰) are not related. However, there is a good correlation for values of gases at low temperatures and for gases of values at high temperature.

These results suggest a dual source of fumarolic fluids, specially in the Turrialba case. According to Martini *et al.* [2] the fumarolic gases from the Turrialba volcano were originated from gases of mantle origin and from a hydrothermal aquifer.

[1] Vaselli *et al.* (2010) *Bull. Volcanol* **72**, 397-410. [2] Martini *et al.* (2010) *J. Volcanol. Geotherm. Res* **198**, 416-432.