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Diffuse emissions of CO₂ as a volcanic monitoring technique applied to the study of Lastarria volcano, Northern Chile (CVZ).

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Most volcanic systems emit large volumes of gases into the atmosphere, even those in dormant state. Volcanic gases may precede the coming of eruptions in weeks or even months. This means that the measurement of gases in active volcanoes can provide valuable information on the current status of a volcanic system and can be used as a monitoring technique. Lastarria volcano, currently the most important source of gases of the CVZ, is placed in the position No. 58 in the SERNAGEOMIN ranking of dangerous volcanoes in Chile. This volcano has permanent fumaroles on the craters and in his NW flank and it presents deformation affecting an area of 6 km wide. The methodology used for this work is the application of an accumulation chamber with a LICOR-820 infrared gas analyzer. The measurement is performed by placing a chamber directly on the ground and the CO₂ goes through the gas analyzer. Two sets of measurements were taken, one in 2014 and other in 2016, both of them on the NW flank of the volcano. The results for the CO₂ flux shows: (1) a minimum of 0.33 g/m²d, a maximum of 2281.90 g/m²d and a total flux of 81.33 t/d in an area of 255839 m² in 2014 and (2) a minimum of 0.38 g/m²d, a maximum of 2309.67 g/m²d and a total flux of 46.19 t/d in an area of 637327 m² in 2016. Most anomalies are identified in the fumarolic field in the NW flank of the volcano; however there is a trend of an increasing flux towards NW where there are incipient low temperature fumaroles. This preliminary data are interpreted as a fluid migration in that direction. Finally, the study of CO₂ emissions can be useful to determine variations in Lastarria volcanic system and its relationship with future eruptions.