



## Ground deformation before the 2015 eruptions of Cotopaxi volcano detected by InSAR

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### Abstract

Cotopaxi volcano started a period of volcanic unrest in April 2015 that led to a series of eruptions between August and November 2015. We use COSMO-SkyMed Interferometric Synthetic Aperture Radar supported by continuous GPS observations spanning the period of 2014–2016 to obtain time-dependent ground deformation data over Cotopaxi volcano related to the period of unrest and onset of eruptions. We find evidence of precursory deformation, with a maximum uplift on the western flank of 3.4 cm from April to August 2015. Deformation is explained by an inclined sheet intrusion located a few km southwest of the summit with an opening volume of  $6.8 \times 10^6 \text{ m}^3$ , extending from a depth of 12.1 km and shallowing to 5.5 km below the summit, that contributed to internal edifice growth. The temporal coincidence of deformation prior to the eruptions potentially suggests that short-term eruptions at Cotopaxi are partly controlled by episodic edifice growth.

### Available in:

*Geophysical Research Letters*, 2017, vol. 44, no 13, p. 6607-6615.

DOI: 10.1002/2017GL073720

<http://onlinelibrary.wiley.com/doi/10.1002/2017GL073720/full>

