

# **Recent volcanic uplift in the central Andes discovered by satellite radar interferometry – Does it pose a hazard?**

**Matthew E. Pritchard (1)**

(1) Department of Earth and Atmospheric Sciences, Cornell University, Ithaca, NY 14853, U.S.A. (pritchard@cornell.edu).

We use Interferometric Synthetic Aperture Radar (InSAR) data from 6 satellites to assess the level of ground displacement at more than 1,000 volcanic structures in the remote central Andes between the years 1992-2008 and find at least 7 areas of active surface deformation. Two areas of ground inflation are particularly enigmatic: Uturuncu volcano, Bolivia, and an area between the Quaternary volcanoes of Lastarria and Cordon del Azufre on the border between Chile and Argentina (hereafter called Lazufre). These areas of uplift are globally anomalous in that they are not obviously associated with recently erupted volcanoes (within the last few 10 thousand years). However, the uplifting areas can be related to Quaternary volcanoes dominated by silicic lavas and an association is suspected.

For several reasons, Uturuncu and Lazufre are candidate locations for large eruptions of potential global impact (Volcanic Explosivity Index > 6). For example, we observe magma to be accumulating at rates associated with previous magmatic "flare-ups" that resulted in wide-spread large eruptions; the long period of repose (> 200,000 years for Uturuncu, Sparks et al., 2008) means that extensive magma could have accumulated if the present rates of intrusion were continuous for that length of time; at least one of the areas (Uturuncu) has frequent shallow earthquakes (Sparks et al., 2008) which are sometimes associated with magma moving near the surface; and the central Andes has a history of recent large eruptions.

It is difficult to assess the hazard posed from the observed intrusions because of many unanswered questions: will the magma we currently observe to be intruding ever erupt, and, if so, are we measuring an early, middle, or late stage in the accumulation to eruption? We do not think that an eruption is imminent at Lazufre or Uturuncu, but we do recommend further monitoring. For example, the shallow earthquakes we have observed at Uturuncu are possibly a tectonic response to the ongoing uplift and not related to magma moving near the surface (Sparks et al., 2008). Furthermore, our preliminary work using the geomorphology of streams that cross the uplift to date the duration of uplift suggests that uplift has not been continuous for more than 100-200 years.