



Steady subsidence of a repeatedly erupting caldera through InSAR observations: Aso, Japan

Adriano Nobile (1,2), Valerio Acocella (2), Joel Ruch (3), Yosuke Aoki (4), Sven Borgstrom (5), Valeria Siniscalchi (5), and Nobuo Geshi (6)

(1) Royal Museum for Central Africa, tervuren, Belgium (adriano.nobile@africamuseum.be), (2) Dipartimento Scienze Università Roma Tre, Roma, Italy, (3) King Abdullah University of Science and Technology, Jeddah, Saudi Arabia, (4) Earthquake Research Institute - The University of Tokyo, Tokyo, Japan, (5) INGV – Osservatorio Vesuviano, Napoli, Italy, (6) Geological Survey Japan, AIST, Tsukuba, Ibaraki, Japan

The relation between unrest and eruption at calderas is still poorly understood. Aso caldera, Japan, shows minor episodic eruptions, mainly phreatic, associated with steady subsidence. We analyse the recent deformation of Aso using SAR images from 1993 to 2011 and compare this with the eruptive activity. Although the dataset suffers from limitations (e.g., atmospheric effects, coherence loss, low signal to noise ratio), we observe a steady subsidence signal from 1996 to 1998, that suggests an overall contraction of a magmatic source below the caldera centre, from 4.5 to 7 km depth. Because of the similar volumes of the contracting source and erupted material, we propose that the contraction may have been induced by the release of the magmatic fluids feeding the eruptions. If confirmed by further data, this hypothesis suggests that degassing processes play a crucial role in triggering minor eruptions within open conduit calderas, as at Aso. These features underline the importance of defining any eruptive potential also from deflating magmatic systems with open conduit.