



Crustal deformation induced by volcanic activity measured by InSAR time series analysis (Volcan de Colima-Mexico)

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The Volcán de Colima (CV) is currently the most active Mexican volcano. After the 1913 plinian activity the volcano presented several eruptive phases that lasted few years, but since 1991 its activity became more persistent with vulcanian eruptions, lava and dome extrusions. During the last 15 years the volcano suffered several eruptive episodes as in 1991, 1994, 1998-1999, 2001-2003, 2004 and 2005 with the emplacement of pyroclastic flows. During rain seasons lahars are frequent affecting several infrastructures such as bridges and electric towers.

This work is focused on the detection of surface deformation with centimetre or sub-centimeter accuracy of the Volcán de Colima and surrounding areas. We try to assess the amount and the spatial extension of surface movements of the CV and to get insights into the causes of the surface deformation by using Interferometric Synthetic Aperture Radar (InSAR), a powerful tool ensuring measurements at high-accuracy over large areas.

The image dataset acquired by ESA ENVISAT ASAR (C band) sensor, has been processed using Advanced interferometric techniques (A-InSAR) to overcome the really challenging sources of decorrelation related to the setting context, mainly vegetation and atmosphere, in order to give us the opportunity to detect also very low rates of deformations.

The main objectives of the interferometric analysis is the measurement of deformations in the CV in relation with active tectonics and gravity induced spreading, the identification of magma migration below the surface in the last decade, the detection of the incipient movements of volcanic landslides and large scale volcano instability, and the kinematics of the Colima rift.

We present preliminary results of the A-InSAR processing, in the framework of the interdisciplinary Colima Deformation project (ColDef).