

**The Chachani Caldera on SAR ERS1 data, and associated volcanoes,
comparative analysis on different satellite data:
An application to volcanic hazards in Southern Peru**

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The Arequipa Volcanic District (AVD), composed of Cenozoic volcanoes some of them are active dacitic-andesitic in composition, is analyzed on SAR ERS1 in comparison to LANDSAT-TM data, aerial photographs, DEM, and field data.

On SAR ERS1 data the « Chachani caldera », the unknown source of ignimbrite deposits of Upper Pliocene age, covering an extensive surface of the AVD is identified for the first time. The Chachani caldera has an elongated shape of 25 and 50 km length, with a major axis oriented NE-SW. The western side of Chachani Caldera is bounded by Mesozoic rocks. The eastern volcano-tectonic rim of the caldera is discovered due to slope exaggeration of the side looking SAR ERS1 data. This rim is not clear on optical satellite data because of saturation provoked by the high reflectance of tephra fall deposits. During the Holocene, the Chachani Caldera is developed inside a volcanic complex (5500 m high), and outside of the caldera two strato-volcanoes have been identified. North of Chachani, the Baquetane volcano (5015 m), shows a circular base with a crater open to the SW. Morphological analysis of the volcano on SAR ERS1 and LANDSAT data shows up lava domes inside the crater emplaced probably after a lateral blast event. To the south, the Misti volcano (5822 m), located 15 km east of Arequipa town, has an elongated base with a major axis parallel to the southern rim of the Chachani caldera. Misti volcano is composed of thick interbedding of tephra fall, lahar and lava flows, which show successive explosive activities. The top of the volcano is covered by tephra fall deposits of its latest plinian eruption in the 15th century. This deposit is detected by thermal anomaly on LANDSAT-TM data, and the proximal and distal tephra fall deposits are identified on SAR ERS1.

Historical rockfall, mudflows and flooding had occurred on the western side of the caldera. The main thalwegs starting from the western slopes of these volcanoes converge towards Arequipa, a town of more than 1 million inhabitants. Recent urbanization is now being installed over the volcanic slopes and along the gorges. The town is therefore vulnerable to volcanic hazards and can be easily affected by products of new volcanic activities.