



Displacement monitoring at a volcano with the ground based SAR IBIS-L

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Within the Exupéry Project of the German "Early Warning Systems" program in the "Geotechnologien" framework, a Volcano Fast Response System (VFRS) is being developed by a consortium of German Universities (see <http://www.exupery-vfrs.de>). One part of the VFRS is the monitoring of surface deformation by a hybrid monitoring system combining a ground based Synthetic Aperture Radar (GB-SAR) and Global Positioning System (GPS) sensors. The GB-SAR IBIS-L operates at a frequency of 17.2 GHz (Ku-band) with a synthetic aperture of 2 m. The achievable spatial resolution is 0.75 m in range and 4.5 mrad in cross-range at a maximum distance of 4 km.

A prototype of the VFRS was installed on São Miguel, Azores from April to August 2009. IBIS-L was set up to monitor part of the crater at Fogo volcano. Additionally a weather station and three low-cost GPS receivers were mounted in the monitored area. The power supply was provided by solar panels and the data processing was done automatically in near-realtime in the field. During the measurement period no significant displacement could be detected.

One of the major problems in InSAR processing are the atmospheric path delay and the phase unwrapping. A realtime processing concept is described and the achieved results of the Azores field test are presented.