

MAPPING AND MONITORING OF VOLCANOES USING SPACE-BORNE SAR (SYNTHETIC APERTURE RADAR)

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Volcanic activities are interesting geological processes but they also pose serious threats to human habitat. It is particularly important to develop a near real time mapping and monitoring techniques while a volcano becomes active. Space-borne or airborne SAR (Synthetic Aperture Radar) is one such tool which is an all weather imaging system and which does not depend on solar illumination. There are in general two approaches in monitoring volcanoes using airborne or space-borne SAR: the traditional remote sensing approach and the differential SAR interferometric (geodetic) approach. Although the differential interferometric SAR (or InSAR) is an effective and direct method of pre-eruption monitoring, the limited availability of suitable data in a timely manner is the main problem. In this paper we briefly review the technical and theoretical background important in monitoring volcanoes with SAR and we will also review the detailed studies carried out over the Baiktusai volcano. Baiktusai had a major eruption in 1002 AD whose ash deposited as far as several Japanese islands and it can again become active any time. We have used JERS-1 SAR, JERS-1 OPS and RADARSAT (Standard and ScanSAR mode) data for this study in addition to geology and related topographic maps. It appears the utilisation of multiple data sets is an effective approach and the multiple (two different in this case) frequency (C- and L-band) SAR data appear to be very useful identifying different volcanic flows.