Geophysical Research Abstracts,
Vol. 11, EGU2009-4656, 2009
EGU General Assembly 2009

Generation of a Digital Elevation Model with the Ground Based SAR IBIS-L

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Conventional techniques to generate Digital Elevations Models (DEM) with terrestrial methods are e.g. Photogrammetry, Laser Scanning, Tachymetry and GPS. We present a DEM derived from measurements with the ground based Synthetic Aperture Radar (GB-SAR) IBIS-L and compare it to a DEM derived from Photogrammetry and Laser Scanning.

The GB-SAR IBIS-L operates with a frequency of 17.2 GHz (Ku-Band) with a bandwidth of 200 MHz and has a maximum range of 4 km. The radar unit moves along a linear rail of 2 m length. The observed scene is a quarry in Dieburg, Germany with a maximum range of 300 m. For the generation of the DEM spatial baselines of 50 and 100 mm separation were used.

The quality of the derived DEM is dependent on the physical characteristics of the respective areas in the DEM. As expected, the best agreement between the DEM derived by IBIS-L and the reference DEMs by Photogrammetry and Laser Scanning can be found at a slope of rock and debris (standard deviation 0.8 m), while areas covered with vegetation show larger discrepancies (standard deviation 3.0 m).