

Validation of Digital Surface Model Generated by PRISM onboard "Daichi" (ALOS) for Monitoring Glaciers and Glacial Lakes

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The Advanced Land Observing Satellite (ALOS, nicknamed "Daichi"), was successfully launched on January 24, 2006, and has worked very well more than 4 years. ALOS is carrying on an L-band synthetic aperture radar called PALSAR, and two optical instruments called PRISM and AVNIR-2. The PRISM stands for Panchromatic Remote-sensing Instrument for Stereo Mapping, and performs along-track triplet stereo observations with a forward-, nadir-, and backward-looking radiometers with 2.5 m ground resolution. It is used to derive a precise digital surface model (DSM) or digital elevation model (DEM) with high spatial resolution, and they can use any application fields as the background information e.g. runoff and flooding analyses in hydrology and monitoring damages by natural disasters. The sensor calibration is very important in achieving the precise DSM generation using PRISM stereo pair images.

This paper describes updated calibration results of ALOS optical instruments, focusing on geometric accuracy of PRISM including time trends of the improvements, and validation of generated DSM by PRISM. We are evaluating generated DSM in several test sites in Japan and foreign countries. We have achieved 7.8 m (RMSE) of absolute geometric accuracy of the PRISM nadir-looking radiometer. The validation of generated PRISM DSM is shown using reference DSM acquired by airborne Lidar. The height accuracy of the PRISM DSM has achieved 5.2 m (RMSE). In addition, generated PRISM DSMs were validated in mountainous snow-covered region in Japan and glacier regions in Nepal for monitoring glaciers and glacial lakes.

Keywords: Earth Observation, Remote Sensing, Glacial lake, ALOS, PRISM, Digital Elevation Model