



Evaluation of the MSG-SEVIRI snow-cover product potential in hydrological modeling

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Spinning Enhanced Visible and Infrared Imager (SEVIRI) instrument on board of METEOSAT Second Generation (MSG) geostationary satellite enables snow cover monitoring at very high temporal resolution of 15 min. It is one of the key components of the recent EUMETSAT program for Satellite Application Facility on Support to operational Hydrology and Water Management (H-SAF) Project. The main goal of the project is to develop, and test new satellite products in order to comply the requirements for operational hydrology and water resources management.

The objective of this study is i) to compare snow cover product (H10) derived from MSG-SEVIRI with MODIS (MOD10A1) snow cover product, ii) to observe H10 product accuracy against in situ snow observations, and iii) to test potential of H10 product for calibration and validation of a conceptual hydrologic model. We compare MSG-SEVIRI, MODIS grid maps and daily snow depth measurements at 272 climate stations over Austria in the period from October 2007 to June 2012. The results indicate that temporal merging of 15 minutes MSG-SEVIRI observations allows a significant reduction of cloud coverage at daily time scale. The relative number of days with cloud coverage in winter season is on average 35% for MSG-SEVIRI, compared to 65% for MODIS dataset. The coarser spatial resolution of MSG-SEVIRI, namely 0.05°, however, resulted in lower mapping accuracy. The overall snow cover mapping error is 5% for MODIS and 15% for MSG-SEVIRI, respectively. Our results showed that for MSG-SEVIRI dataset, the underestimation errors dominate, and tend to increase with increasing altitude of climate stations.

The potential of H10 for hydrological modeling is examined in two different mountain catchments, one in Austria, and the other in Turkey. We will evaluate the potential of snow H10 product for calibrating and validating a conceptual semi-distributed hydrological model. Our results will discuss the strength and weaknesses of H10 product in comparison to MODIS snow product and to cases when only runoff data are applied.