GEOMETRIC ACCURACY INVESTIGATIONS ON THE ORTHORECTIFIED AVHRR IMAGES

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A joint research project on the geometric accuracy investigations of three different satellite sensors, which are often used to estimate climate variables, has been initiated between ETH Zurich and the Swiss GCOS Office at MeteoSwiss in 2012. This paper focuses on the investigations of the orthorectified AVHRR data. The images have been analyzed in terms of relative, absolute and band-to- band registration accuracy. The methods have been initially developed and tested with the MSG-SEVIRI data and adapted for the orthorectified AVHRR images, which have been generated by the Remote Sensing Research Group at the Department of Geography, University of Bern in collaboration with the Canada Centre for Remote Sensing. For the relative accuracy investigations, large numbers of feature points are extracted and tracked in the AVHRR Band-2 images acquired from Metop-2, NOAA-17 and NOAA-18 on the same day, using the KLT tracker extended with statistical analysis and blunder detection procedures to ensure a robust evaluation. The tests have been performed using AVHRR data acquired on 24 days in 2008, 2 days from each month with minimum cloud coverage. Systematic errors in stripe layout have been observed in all NOAA-18 images. To assess the absolute accuracy in Switzerland and surroundings, major lakes in the area are used as reference. Lake polygons digitized from Landsat orthophotos have been transformed into the image space. The lake boundaries are fitted to the images via 2D translations by robustly minimizing the intensity values inside the polygons. The lake matching results show that there are 2D shift errors in the images, which are up to 4 pixels for MetOp-2. The data of 6 AVHRR channels has been evaluated for the band-to-band registration accuracy. The results are presented and discussed in this paper.

Keywords: remote sensing; geometry; accuracy; AVHRR

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