Accuracy assessment of snow cover classification from the Collection 6 MODIS snow cover images product over Austria

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Moderate Resolution Imaging Spectroradiometer (MODIS) snow cover images have great potential in hydrological modelling because of their good temporal and spatial resolutions. A new collection of MODIS snow cover maps from both Aqua and Terra satellites was released with directly publishing the Normalized Difference Snow Index (NDSI). In this study, NDSI value 0.37 and 0.34 were selected as the threshold of NDSI for defining the snow-covered at 666 Austrian eHYD snow depth stations for Aqua and Terra respectively, which was ever 0.40 for both satellites as the threshold of NDSI used in the former collection of 'binary' MODIS snow cover products. The overall accuracy of MODIS snow cover products, MYD10A1 (Aqua) and MOD10A1 (Terra), could be 97.06 and 97.16% in the period of September 2002 to August 2014. Relative higher accuracy stations were found in the flat and undulating area, while lower ones were found in the higher alpine regions. It is investigated that the accuracies were also related to the slope and aspect of the pixels where the stations locate. Steeper slope and the aspect facing to the North would contribute to the low accuracy of the MODIS snow cover maps. Accuracies of MODIS snow cover maps at the Austrian stations had seasonality variance, they were high in the snow well-developed period and no snow season, but lower when snow is patchy and at the snow accumulating period, especially for snow depths under 5 cm. Using the newly selected threshold of NDSI could increase the accuracy of the MODIS snow cover products, obviously for the images of Terra from December to March by 0.45%, 0.59%, 0.56% and 0.26%. Higher accuracy increasements were also found in the high altitude stations.