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A comparison of snow cover retrieval algorithms over the European Alps using NOAA AVHRR data

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NOAA AVHRR has been employed for the last 25 years with little changes of the sensor over time and consequently offers a unique data archive for satellite-derived long-term studies. An additional advantage is the high temporal resolution of NOAA AVHRR which overcomes the problem of frequent cloud cover over the Alps whereas the medium spatial resolution means a challenge in snow cover retrieval in the rugged terrain of the Alps.

The performance of selected snow retrieval methods based on techniques such as spectral unmixing, threshold approachs and aggregated rating applied to NOAA AVHRR HRPT data derived from different sensors have been tested and compared to each other. Selected snow cover maps ahve been generated considering the whole time period as well as the distinct Alpine Regions and compared with in situ surface parameters from snow stations in the Swiss Alps. Strengths and weaknesses related to snow detection, sensor portability and robustness in rugged terrain of each method have been evaluated in order to establish a reasonable basis of decision-making for the foreseen assembling and reprocessing of NOAA AVHRR data.

The provided archive reaching back to 1984 will now be processed with a suitable snow cover algortihm supporting also older sensors. Non-target signal variability such as atmospheric variability, sensor calibration effects and sensor drift need to be removed to ensure that trends in the time series obtained from the archived data are real and not instrumentally caused artifacts. The compiled time series needs to undergo further validation by using ground based station data as well as data derived from other satellites. The established and vaildated time series data set will then be available for the use in long-term climate related studies concerning snow cover dynamics over the European Alps.