Long-term data records of Essential Climate Variables derived from AVHRR LAC – problems and solutions

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Changing climate is influencing our environment with increasing pace. Systematic observations to monitor its impact on many essential climate variables (ECVs) are therefore strongly required. Complementary to ground measurements and climate models, satellite remote sensing represents a valuable tool to get comprehensive information that can not only be used for time series analysis on its own, but also serves as an independent reference to evaluate results from climate models. One sensor with high potential for long term monitoring is the Advanced Very High Resolution Radiometer (AVHRR) onboard NOAA- and MetOp-satellites. Dating back to 1980 it offers an unprecedented data set for global monitoring with a daily resolution. The University of Bern receives and archives AVHRR data over Europe since 1981 and has meanwhile established a unique AVHRR-archive with the potential to serve as a fundamental climate data record (FCDR). This record will be made publicly accessible in the framework of ESA's long-term data preservation (LTDP) activity. The data record covers more than the last 30 years and has been used for the retrieval of a set of ECVs such as snow, albedo, aerosols, or lake surface water temperature. Major drawbacks of the sensor suite are the missing on-board calibration of the channels 1, 2 and 3, and the orbit drift of the earlier NOAA-satellites. Hence, appropriate pre-processing including state-of-the-art calibration and sophisticated geocoding is the critical step on the way to generate reliable information of our environment.

The talk will show some details of our AVHRR-archive, the importance of pre-processing, validation, and the product retrieval including time series of snow extent, albedo and lake surface water temperature. Finally, some recommendations will be given on the usage of AVHRR for climate applications and the next steps to make our archive accessible via ESA web site will be presented.