

AVHRR LTDR product cloud and snow mask using Support Vector Machines

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The Advanced Very High Resolution Radiometer (AVHRR) sensors aboard the different NOAA satellites provide a unique global remote sensing dataset that ranges from the 1980s to the present. Using these data, the NASA funded Long Term Data Record (LTDR) project aims to develop a quality and consistent Climate Data Record (CDR) of AVHRR data with the use of the Moderate Resolution Imaging Spectrometer (MODIS) instrument as a reference. The current product uses a simple climatology approach using the red band to mask clouds from land and has no internal algorithm to discern cloud from snow. Previous studies using AVHRR data make use of MODIS climatology or multispectral threshold techniques. In this study we aim to use both approaches to better detect clouds and snow. We do this by assigning a probability of belonging to each class according to the distance of each pixel to the average climatology MODIS pixel, and to the multispectral clusters obtained using MODIS bands analogous to AVHRR. These distances are then treated as independent variables in an SVM classification that best selects the threshold to increase the separability of the classes. First, this approach is tested on MODIS data, and then applied to AVHRR. The main objective is to increase the overall accuracy of the classification, since errors in the cloud/snow mask have a significant impact on accurately determining global long-term trends of level-2 parameters such as surface albedo and have a direct impact on the Earth's radiative forcing.

Keywords: AVHRR, LTDR, Cloud Mask, Snow detection, SVM