

EARTH OBSERVATION SYMPOSIUM (B1)
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EFFICIENT DATA ANALYSIS OF MODIS SATELLITE IMAGES

Abstract

This work presents the MODANT software tool, which was developed for efficient data analysis of MODIS earth observation images. MODIS (Moderate-resolution Imaging Spectroradiometer) is a scientific payload from NASA on board the Terra and Aqua satellites. The MODIS instruments provide daily low resolution imagery for global large-scale dynamics of Earth. A variety of data products based on MODIS images are available, this work focuses on the thermal anomalies product, which contains bit masks indicating the probability of fire in a given pixel. The MODANT software is utilized from our scientific partner to monitor deforestation in Africa. The evidence of a single fire pixel in a given data set is not enough for accurate monitoring, thus a statistical analysis over long time periods need to be performed. The key features of the MODANT analysis software are simple data acquisition using an optimized graphical user interface and the efficient analysis of key parameters. The graphical user interface was tailored for the scientific end user to easily gather large data sets from the image servers. By selection of dates and locations, MODANT automatically retrieves all required data sets for the analysis procedure. The automatic retrieval process includes identification of affected tiles, checking for available data sets in a specified time period and reprojection in desired coordinates. The second key feature of the MODANT software is the efficient analysis of key parameters. Due to the large data volume of the retrieved data, the data analysis would take up to several hours. A tailored data format was designed to speed up the analysis process by orders of magnitude.

This work is structured as follows: The introduction section explains the application background and the challenges of automatic data analysis in this context. Section 2 describes the graphical user interface of the MODANT software tool, which facilitates the data acquisition and analysis process. A data format for efficient statistical evaluation of large data volumes is described in section 3. The paper concludes with a comparison of implemented analysis strategies and their performance.