

Joint use of ENVISAT MERIS and TERRA ASTER satellite data for monitoring landcover dynamics in the Niger Inland Delta (Westafrika)

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A growing number of land surface products, derived from data of very different satellites, have been developed during the recent past years, enabling user communities to analyse a great variety of (environmental) questions. Though this wide range of products seem to fit to nearly every application, many complex tasks can't be answered in a satisfactory manner by using data from only one sensor. This paper aims to present an algorithm for a combined use of spectral high resolved optical and NIR data from MERIS sensor with spatial high resolved data from ASTER sensor. The latter measures also in the SWIR part of EMS.

The authors examined to what extent ASTER spectral bands could be simulated by information of MERIS bands and vice versa. Considerations were based on the different bandpositions and -widths of ASTER and MERIS bands. An ASTER band will be simulated therefore with the help of those MERIS bands that fall into the spectral range, covered by its bandwidth. One has to take into account that an individual MERIS band contributes to the simulated ASTER value according to the spectral sensitivity of the original ASTER band at the position of that MERIS band. This leads to the introduction of weighting factors for each MERIS band that were calculated in an adjustment process. We also introduced an additional parameter for each simulated band, that describes the discontinuous coverage of an ASTER band by the MERIS bands. It also includes any system-specific differences in data registration by the two sensors. The parameters were calculated in a first step over spectrally homogeneous surfaces. We found that the values were independent from the used surface. In a next step we relaxed the constraint of using homogeneous surfaces and found that parameters were also independent from the homogeneity of the used surface.

At this point of our research work, we can conclude that simulation of spatial high resolution ASTER data is reliably possible by means of information from MERIS data, providing a transfer of the spectral high resolved MERIS data into spatial high resolved ASTER data. Whether this transformation applies also in reverse direction is currently examined by the authors. Even without having clarified this last point in detail we can state that a joint use of ASTER and MERIS data promises improved results for a wide range of tasks at the field of landuse / landcover analyses.