

**Combining multi resolution satellite data for assessment of surface water stress – the triangle method applied to MODIS and Geostationary MSG-SEVIRI data.**

Inge Sandholt <sup>1</sup>, Claus Nielsen <sup>1</sup>, Simon Stisen <sup>2</sup> and Mads O. Rasmussen <sup>1</sup>

<sup>1</sup>Department of Geography and Geology, University of Copenhagen, Østervoldgade 10, 1350 Copenhagen K, Denmark

<sup>2</sup> GEUS, Geocenter Denmark, Østervoldgade 10, 1350 Copenhagen K, Denmark

Geostationary Earth Observation data carry a large potential for assessment of surface state variables. Not the least the European Meteosat Second Generation platform with its SEVIRI sensor is well suited for studies of the dynamics of land surfaces due to its high temporal frequency (15 minutes) and its red, Near Infrared (NIR) channels that provides vegetation indices, and its two split window channels in the thermal infrared for assessment of Land Surface Temperature (LST). For some applications the spatial resolution in geostationary data is too coarse. Due to the low spatial resolution of 4.8 km at nadir for the SEVIRI sensor, a means of providing sub pixel information is sought for. By combining and properly scaling two types of satellite images, namely data from the MODIS sensor onboard the polar orbiting platforms TERRA and AQUA and the coarse resolution MSG-SEVIRI, we exploit the best from two worlds. The vegetation index/surface temperature space has been used in a vast number of studies for assessment of soil moisture, dryness indices, evapotranspiration and for studies of land use change. The high temporal frequency of image acquisitions with the SEVIRI sensor means that not only information on diurnal variations in LST can be derived, but also that the information related to surface moisture conditions and water stress contained in the morning rise in LST can be exploited fully. In this paper, we present an improved method to derive Evaporative Fraction (EF) from a combination of MODIS NDVI data with a spatial resolution of 250m with 3 Km SEVIRI LST data. A hierarchical, deterministic scaling method has been applied to the data, and is compared to existing deterministic downscaling methods based on LST and NDVI. We also compare our results to the conventional interpretation of the LST/NDVI space, as for instance formulated in the TVDI, a method that is highly relevant for use with polar orbiting data alone. The analyses are done on data covering the West Africa.

Corresponding author: Inge Sandholt

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**Inge Sandholt**

Associate Professor

Department of Geography and Geology, University of Copenhagen, Østervoldgade 10, 1350 Copenhagen K, Denmark

Email: [is@geo.ku.dk](mailto:is@geo.ku.dk)

**Claus Nielsen**

Department of Geography and Geology, University of Copenhagen, Østervoldgade 10, 1350 Copenhagen K, Denmark

Email: [cln@geo.ku.dk](mailto:cln@geo.ku.dk)

**Simon Stisen**

GEUS, Geocenter Denmark, Østervoldgade 10, 1350 Copenhagen K, Denmark

Email: [sst@geus.dk](mailto:sst@geus.dk)

**Mads O. Rasmussen**

Department of Geography and Geology, University of Copenhagen, Østervoldgade 10, 1350  
Copenhagen K, Denmark

Email: [mor@geo.ku.dk](mailto:mor@geo.ku.dk)