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Retrieval of spatially distributed hydrological properties based on surface temperature rise measured from space for spatial model validation at regional scale.

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Traditional hydrological models are often validated by aggregating catchment observations at a single discharge point and therefore it lacks on the spatial component of the model performance. Most recent distributed models offer new possibilities, however development of new methodologies to calibrate and validate the spatial pattern of the model outputs is still necessary.
The use of satellite earth observation (EO) platforms is in this line a good alternative both for calibration and validation of hydrological models. EO satellites provide valuable information at different temporal and spatial resolution that can be related to hydrological variables like evapotranspiration (ET) or soil moisture (SM) for instance.
Over Denmark, a combination of Aqua and Terra MODIS satellites provides 4 daily observations at different times of the day. By using two of these observations, Land Surface Temperature (LST) from Aqua around 6:00 AM and a second LST from Terra around 11:30 AM, combined with other ancillary data related to the incident energy on the surface, we were able to calculate the temperature rise of the surface for each day. Temperature rise will be affected by different factors such as a moist condition, ET, etc. and therefore provided valuable information not just daily but on the long term on surface conditions.
In this study we have used all MODIS arcade data to obtain the temperature rise of the surface over Denmark using two different configurations. One covering all seasons and a second configuration in which only the data corresponding to the growing season was used. Later, we compared spatial patterns of hydrological variables, land cover types and lithology's with those obtained from the satellite observations. Results showed spatial pattern similarities between satellite derived products and the different data sets used as reference.