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Evapotranspiration estimates from an energy water balance model and satellite Land Surface Temperature over the desertic Heihe river basin

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The objective of the presentation is the estimate of evapotranspiration (ET) using a distributed hydrological model (FEST-EWB) which is calibrated employing satellite Land Surface Temperature (LST) measurements over the Heihe river basin, a desertic endorheic basin in China. The FEST-EWB ET results are then compared with different ET estimates from various global available ET models products, accounting for the models' approximations: the Chinese ETMonitor, ET MOD16, MERRA2, ERA-INTERIM, GLDAS-2 and GLEAM.

The FEST-EWB calibration is performed at daily time scale, involving over 50 different test dates throughout year 2012. Satellite LST data is obtained from the MODIS instrument (product MOD11A1) aboard satellite Terra, at a 1km spatial resolution. This allows a distributed, pixel-by-pixel calibration, instead of the classical procedure for hydrological models, which is based on discharge time series and basins lumped in one single entity.

From the calibrated model, estimates of energy and mass fluxes (sensible heat, latent heat and evapotranspiration) are obtained.

First, these results are compared with the data gathered by two eddy covariance stations found in the agricultural area of the basin. The overall agreement between the estimated and measured data is good, as certified by numerous statistical indexes.

Then, a considerable variability emerges in the comparison with the more global model products, as a consequence of the different foundational model hypotheses.

All the results are also filtered according to the pixels' land cover type, looking for trends.