



An diurnal land surface evapotranspiration retrieval model based on geostationary satellite data

C. Zhao, J. Xia and Z. Li

Institute of Geographical Sciences and Natural Resources Research, Chinese Academy of Sciences, Beijing, China(zhaocs.05b@igsnr.ac.cn / Fax: 86-10-64888975 / Phone: 86-10-64889010)

Sensible heat and latent heat are the most important element in the natural energy balance. Especially the latent heat is of significant importance to the agriculture, hydrological cycle and the regional climate, which influence greatly people's daily life. This paper presented a diurnal two-source model to computer sensible heat and latent heat at any time of a day. It can serve for study of time scale, for hydrological model, for agricultural crop production evaluation, for research of regional climate, and for water resources management, etc. Compared with other evapotranspiration(ET) model, the dominant advantage of our model is that it can supply ET value of bare soil area, vegetation area and sparse-vegetated area at any time of one day, even at a specific minute. Paramters of the model is calibrated with the database from 12 stations of Hapex-Mobilhy(1987) in south of France and 3 Spanish stations and a Chinese one from Fluxnet. The inputs of this model include satellite data of downward and upward long-wave radiation, short-wave radiation, reflectivity, albedo etc. from the geostationary satellite(MSG-9 of EUMETSAT) having a temporal resolution of 15 minutes and a spatial resolution of 3km; of ground meteorological data of wind speed, air temperature at 2m high. Its outputs include soil heat flux G , sensible heat flux H and latent heat flux LE at arbitrary time of one day. Validation with ground measured data shows a root mean square error (RMSE) of 17.2w m^{-2} for G , 35.7w m^{-2} for H and 32.3w m^{-2} for LE , which is an satisfactory achievement for agricultural and hydrological use.