PROPOSAL FOR FLUXNET SYNTHESIS PUBLICATION

Initial coordinators: Name Zhuoqi Chen[1]

Collaborators needing access to data: Names Jun Qin[2]

Affiliations: [1] Beijing Normal University, Beijing, China
[2] Instituted of Tibetan Plateau Research, CAS, Beijing, China

DATASET PROPOSED

Opened

TITLE OF PAPER AND OUTLINE

TITLE : A simple method to determine the Priestley-Taylor parameter using MODIS data.

Evapotranspiration (ET) is a primary process driving the energy and water exchange between the hydrosphere, atmosphere and biosphere. It is essential to understand the water cycle, climate dynamics and terrestrial ecological processes. Different methods have been proposed for measuring ET on various spatial scales from individual plants (Bowen ratio) to fields or landscape scales (eddy correlation). However, conventional techniques provide essentially points measurements, which usually do not represent area means because of the heterogeneity of land surfaces and dynamic nature of heat transfer process. Satellite remote sensing is a promising tool for ET estimations from regional to the global.

There are three groups algorithms used to estimate ET from satellite remote sensing. The fist group is empirical models. Empirical model relate satellite retrievals (Rn, Ts, Ta, VI) with ET measurements. Wang et al(2007) proposed a simple empirical expression to estimate ET. This expression is only related with Rn, Ta or Ts and VI. Most this group models have one or more empirical parameters. Before use these models, they need local calibration.

The second group is based on the Penman-Monteith (PM) Models. For example, Cleugh et al developed RS-PM model. Mu et al (2007, 2011) improved the model and applied this model to estimate globally ET (MODIS ET). The PM equation was widely modified and applied. Major difficulties in application of the PM equation include how to parameterize canopy conductance and soil water stress (Wang et al, 2012).

The third group is based on the Priestley-Taylor (PT) equation. The PT equation can be considered a simplified version of the more theoretical Penman equation. In this model, the most difficult issue is to determine the PT parameter. This parameter, is typically of the order of 1.2-1.3 under water unstressed conditions, but can range from 1.0 to 1.5.

In this study, we try to develop a robust and simple algorithm to estimate global

evapotranspiration based on PT equation. The key point is to estimate PT parameter. PT parameter is highly related with soil moisture in the rooting zone. MODIS data is used to retrieval a soil moisture indicator in this study. Actually, we found this relationship between PT parameter and soil moisture indicator by using ameriFlux data. We want to get global flux data to confirm this relationship.

PROPOSED SITES TO BE INVOLVED

We will use FLUXNET data from 1995 to the present. Data from 1995 to 2000 will be used to establish and confirm relationship between PT parameter and soil moisture indicator. Data from 2000 to present is used to validate ET estimated by our PT equation. We request access to the whole LaThuile data set for this study.

PROPOSED RULES FOR CO-AUTHORSHIP

All data contributors making an intellectual contribution will be included as named coauthors. Data contributors not making an intellectual contribution will be included as group coauthors in the author list, if possible with the journal (i.e., "and the FLUXNET Synthesis Group"). Group coauthors will be identified by name in the acknowledgements. We will circulate a summary of initial findings to all data providers, and solicit feedback; this will be followed by a draft manuscript, which we will also circulate for feedback. Data providers who have contributed intellectually and will be included as coauthors will be sent the final version of the manuscript prior to journal submission.