

PROPOSAL FOR FLUXNET SYNTHESIS PUBLICATION FOR OPENED FLUXNET-LA-THUILE DATA SET



Initial coordinators:: Xianglan Li & Jiquan Chen

Collaborators needing access to data:

Jiquan Chen: University of Toledo, Toledo, OH, USA

Xianglan Li: Beijing Normal University, Beijing, China

Affiliations:

TITLE OF PAPER AND OUTLINE

Title: Development of a Physical-Empirical algorithm for global terrestrial latent heat flux based on FLUXNET data set and MODIS products

Description: The terrestrial latent heat flux (LE) plays an important role in exchanges of energy, water, and carbon among the terrestrial biosphere, hydrosphere, and atmosphere. It is difficult to accurately estimate terrestrial LE because the land surface is generally more heterogeneous than the sea surface and there is much uncertainty about complicated biophysical processes. Since the 1990s, eddy covariance (EC) flux towers provided by FLUXNET projects have been used to measure LE. However, the sparse observations hamper accurate characterization of spatiotemporal LE patterns over large spatial scales. Remote sensing is considered as the most viable method for producing spatially distributed global or regional LE products. Therefore, developing operational global terrestrial latent heat flux algorithm is critical for detecting and assessing droughts, and performing regional hydrological applications.

A number of predictive models are available for quantifying ET at large scales, such as Statistical and empirical methods (SEMI), Surface energy balance (SEB) models, Penman-Monteith (PM) and Priestley-Taylor (PT) approaches and Data assimilation (DA) methods. However, large uncertainties in ET estimation remain due partially to the resolution. FLUXNET data offers a unique opportunity to evaluate ET modes at the larger scales.

In this study, we will first develop a Physical-Empirical algorithm, an operational global terrestrial latent heat flux algorithm based on FLUXNET data set and MODIS products. We will estimate global ET based on GMAO-MERRA datasets and MODIS

products with high-resolution and long time series. The objectives of our study are to: (1) design a global terrestrial latent heat flux algorithm over various biomes and geographical regions; (2) perform a series of cross validation of the global terrestrial latent heat flux algorithm based on FLUXNET data set; (3) generate global ET product with resolutions of 1 km×1 km during 2001-2002 using this operational global terrestrial latent heat flux algorithm. The ET product of land surface will be open to the public.

PROPOSED SITES TO BE INVOLVED

We will use FLUXNET data from 2000 to the present, corresponding to the availability of MODIS data products. We request access to the whole La Thuile dataset for this analysis.

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.

Please see the CV of Jiquan Chen and Xianglan Li in the attached files.