PROPOSAL FOR FLUXNET SYNTHESIS PUBLICATION

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TITLE OF PAPER AND OUTLINE

Inter annual variability of growing season length and its influences on annual carbon budget as derived from carbon flux measurement.

In a climate change scenario the identification of the drivers of GHG budgets is becoming a rising issue. The drivers of annual carbon budget can be identified as biotic, and abiotic. Growing season length (GSL) is a proxy of both. In many different field studies the annual carbon budget is reported to be strongly influenced by the growing season length. Currently there aren´t studies considering large datasets covering large geographic areas and different vegetation types. With this research proposal we want to analyze the growing season length (GSL) inter annual variability comparing different biomes at global scale, moreover annual carbon budget and GSL length relationships will be explored. We aim to answer to the following research questions:

- How to define GSL?

GSL meant as carbon uptake period will be extrapolated from carbon flux measurements partitioned. In particular, for this purpose, we´ll consider gross primary production because it´s strictly related to phenology. We´ll test different methods (i.e., running averages. piecewise regressions, daily sums, logistic derivatives) in a way to consider the uncertainties connected with the method adopted.

- How is annual carbon budget influenced by GSL?

The relationship between annual carbon balance and GSL for each vegetation functional type (IGBP Class) and for bioclimatic type (Boreal, Mediterranean, Temperate, etc.) will be investigated. The final objective is to understand the specific sensitivity of each biome to the inter annual variability of GSL, in order to highlight where GSL is the key factor for carbon budget.

- Which are the climatic drivers (i.e., minimum temperature, day length, water stress) of the GSL at global scale?

The evaluation of the most important climate drivers could permit the simulation of climate change scenarios based on the biome sensitivity to GSL. For this purpose a growing season index model (Jolly et al., 2005) will be adopted. The main drivers will be identified by mean of a sensitivity analysis permitting to disentangle climate change sensitivity.

PROPOSED SITES TO BE INVOLVED

The analysis will be performed using daily averages and the geographical scale will be global. The following IGBP Class will be included: grassland, deciduous broad leaf forest, mixed forest, savanna, shrubland. We may take in consideration all sites containing at least 2 full years of flux measurements and meteorological data covering at least 50% of the whole year (gaps must be homogeneously distributed).

PROPOSED RULES FOR CO-AUTHORSHIP

The rules as proposed in the disclaimer for the FLUXNET2007 synthesis will be applied.