**PROPOSAL FOR FLUXNET SYNTHESIS PUBLICATION**

**Initial coordinators:** Antje Moffat, Markus Reichstein

**Collaborators needing access to data:** Alessandro Cescatti, Gitta Lasslop, Sönke Zaehle

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**TITLE OF PAPER AND OUTLINE**

**Effect of diffuse radiation on ecosystem-level water use efficiency**

The importance of diffuse radiation for terrestrial net carbon exchanges is widely recognized. However, effects on terrestrial water cycling are still largely unknown. In this study, we investigate the influence of light quality on ecosystem-atmosphere carbon and water exchanges using an inductive approach based on artificial neural networks. The functional relationships between meteorology and ecosystem fluxes, such as the hierarchy of the climatic controls or their multivariate dependencies, are identified directly from observations. To check the generality of the obtained relationships, the approach will be applied to a wide variety of ecosystems covered by the FLUXNET data set.

We hypothesize that a higher fraction of diffuse light typically enhances ecosystem-level water use efficiency (GPP/LE, NEE/LE) of photosynthesis, and that there are significant differences between vegetation types with respect to the effect of diffuse radiation on the water use efficiency. A comparison of these findings with typical land-surface schemes is intended.

This proposal is scientifically and methodologically complementary to the ongoing work by Alessandro Cescatti and is performed in close coordination.

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**PROPOSED SITES TO BE INVOLVED**

All sites containing at least one year of flux and respective meteorological data will be considered for this analysis.

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**PROPOSED RULES FOR CO-AUTHORSHIP**

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