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BOOK OF ABSTRACTS
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Posters for Session 15:
In-situ and remote sensing observations

Spatio-temporal mapping of daily photosynthesis in drought conditions using remote sensing observations and in-situ measurements

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Reliable spatio-temporal information about the photosynthesis and its dependence on environmental factors, is crucial for vegetation productivity monitoring, water resources management, and detection of climate change effects.. In this study, we investigated the relationship between time series of Landsat (TM5 and ETM7) optical data, soil moisture measurements and canopy daily photosynthesis of annual C3 grasses at a Fluxnet site (US-Var) during a prolonged drought episode from January to August 2004. By using the 'Soil-Canopy Observation of Photosynthesis and Energy fluxes' (SCOPE) model, time series maps of photosynthesis were simulated via Landsat retrieved vegetation properties maps [notably Leaf Area Index (LAI), leaf chlorophyll content (Cab), leaf water content (Cw), leaf dry matter content (Cdm), the leaf inclination distribution function (LIDF) and the senescent material content (Cs)], locally measured weather data and in-situ soil moisture data. The generated maps of photosynthesis simulated by the SCOPE model were validated at a Fluxnet site (US-Var). The comparison between daily photosynthesis simulations and measurements shows that considerable drought effects on photosynthesis are 'visible' in the Landsat optical bands. However, the most accurate photosynthesis maps are obtained when soil moisture information is added as an extra source of input data to the SCOPE simulations. The results from this study indicate that the combined use of optical remote sensing observations and in-situ measured soil moisture data has a great potential to capture the drought effects on the grass canopy photosynthesis.