

HiWet

Deriving ecosystem health indicators for wetland vegetation by producing high resolution evapotranspiration maps



Inspiration

The HiWet project aims to provide a framework for efficient freshwater wetland ecosystem monitoring and evaluation of ecosystem health, using novel techniques to estimate evapotranspiration (ET) and to derive evaporative stress as an indicator for the health state of the wetland vegetation. The project targets consistent ET retrieval across scales, from the local field scale (fine spatial resolution) to the regional catchment scale (coarse spatial resolution) derived from combined use of hydrological models and remote sensed energy balances. In addition the project aims to contribute greatly to an increased understanding of the functioning of freshwater wetland ecosystems.

Innovation

By combining surface energy balance methods with hydrological models, a new method of multi-scale hydrological water balance modelling (for wetlands) will be developed that is innovative at two levels:

- Dynamic remote sensing data at different resolutions will be used as new data sources to feed the hydrological models (in addition, or as replacement to the traditional 'old' static land/soil/topography maps and weather gages) whereby input and model uncertainties are considered and the obtained output uncertainties (evapotranspiration and flow) are minimised.
- A new paradigm for distributed river basin modelling is proposed, where landscape elements, such as wetlands, and their interactions in the river basin are explicitly represented and where both hydrological and energy balances are computed and respected.

This new approach is especially relevant for wetland management, where evapotranspiration varies dynamically in space and time. A suitable indicator of wetland ecosystem health will be developed based on both classical vegetation analyses and analysis of plant functional traits and types. In order to validate the hypothesis that evapotranspiration estimates are indeed a good indicator of fresh water ecosystem health, these results are evaluated with ground truth data.

Impact

The project will contribute to the monitoring of wetland health status and associated changes in freshwater wetland ecosystem functioning. An output of the project will be the identification of health status indicators that are specific for the main wetland typologies. A better understanding of the reciprocal interactions between hydrology and vegetation also allows making recommendations for wetland management and restoration, especially related to desiccation and eutrophication problems.

Partners

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