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Linking biochemical and biophysical variables derived from imaging spectrometers to ecological models - The HyEco'04 Group Shoot

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ABSTRACT

We report on the first results of the HyEco'04 campaign carried out in summer 2004 as a joint activity of a bi-national team of Belgian and Dutch researchers.

This integrated approach of assessing the complexity of managed natural ecosystems is a demonstrator case for recent focus of airborne imaging spectroscopy activities on ecotones. The test site Millingerwaard has been chosen to demonstrate the potential of imaging spectrometer data to support ecological modelling. The site is located along the river Rhine half way between Emmerich (GER) and Nijmegen (NL) and is a typical river floodplain as often found in the Dutch landscape.

Several ground support teams supported the data acquisition of the Hymap sensor during its overflight on two days in July and August 2004. Field measurements concentrated on two approaches: first, radiometric measurements supporting the linking between soil-vegetation-atmosphere transfer modelling (e.g., sunphotometer, leaf optical properties measurements, canopy reflectance, structural parameter measurements (gap fraction, leaf angle distribution, leaf area index) have been performed and secondly supporting additional measurements on vegetation (species mapping, destructive biomass sampling), water (quality), and soil (moisture, temperature) have been performed.

First, we will report on the data quality evaluation of the various data sources and their integration into an integrated system, dealing with various aspects of spatial sampling schemes and potential spatial discontinuities, as well as uncertainty measures.

Secondly, we discuss several spatially distributed products derived from either ground based measurements and inventory mapping, extrapolated to the full coverage of the test site or imaging spectrometer derived products (biophysical and biochemical variables).

The resulting products are discussed in view of potential incorporation into land-biosphere models, where high or even unknown uncertainty in input data, and limited availability of geographically explicit input data are usually the limiting factors for the application of ecological models on a larger spatial extent (e.g. national).