COMBINING EARTH OBSERVATIONS, GIS DATA AND ECO-HYDROLOGICAL MODELLING FOR PREDICTING CARBON BUDGETS AND WATER BALANCE

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Remote sensing data, GIS data and an eco-hydrological model (Daisy) are coupled within the project EO-FLUX-BUDGET for the prediction of CO_2 budgets and water balance at Zealand which is the major island of Denmark (covering approximately 7.000 km2). In order to catch the surface heterogeneity shaped by the large variety of small fields, a high-resolution (30 m) land surface map is produced from satellite observations and validated using GIS data and national statistics on agricultural land use. GIS information on the housing density of built-up areas was superimposed on the land use map to facilitate the implementation of engineering methods for assessment of surface runoff in these regions. A geological soil map is combined with soil texture data registered in 5439 locations to construct a 3-layer GIS based soil map. The ground water depth is represented by the 10 year average water head elevation which is simulated by a distributed hydrological model (MIKE SHE). The Daisy model is run using grid based meteorological data and the results are evaluated by comparing with eddy covariance atmospheric fluxes recorded in agricultural, forest and urban regions. Temporal maps of vegetation properties are produced using multi-scale remote sensing data (Landsat TM, Terra-MODIS and SPOT-VEGETATION) and used to adjust the simulated leaf area indices. The initial result shows that the model efficiency is improved by the implementation of satellite data.