AGGREGATION OF SATELLITE REMOTE SENSING-BASED LAND COVER ROUGHNESS APPLIED TO METEOROLOGICAL MODELLING

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The land surface momentum flux and heat fluxes strongly depend upon land surface characteristics that are possible to map from satellite Earth observation data. A description of satellite remote sensing imagery used for mapping the land cover classes as well as the vegetation Leaf Area Index (LAI) in the mid-latitudes is given. The maps are used as input to a two-dimensional meteorological model in the horizontal domain. The study presents this physically-based aggregation model capable of calculating larger-scale grid values of the roughness for momentum ($<z_{0m}>$) and the roughness for scalars ($<z_{0t}>$) such as heat, water vapour and CO_2. It is demonstrated that the application of the large-scale roughness for momentum improved wind predictions in the numerical weather prediction model HIRLAM. Further does the aggregation model calculate high-resolution maps of friction velocity and heat fluxes at the regional scale using different methods for estimating the hydrological fluxes and the CO_2 balance. Surface-flux comparisons will be made. The aggregation technique for the scalar roughness length is physically-based and it is a highly innovative step forward for obtaining an improvement to the kB-1 parameterization (i.e. the relationship between z_{0m} and z_{0t}) at larger grid scale for heterogeneous terrain.