



Effect of realistic vegetation variability on seasonal forecasts

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A real predictability hindcast experiment with prescribed Leaf Area Index (LAI) has been performed using the state-of-the-art Earth System Model EC-Earth. LAI input to the climate model has been prescribed using a novel observational dataset based on the third generation GIMMS and MODIS satellite data. The LAI dataset has been pre-processed (monthly averaged, interpolated, gap-filled) to use it in the land surface scheme of EC-Earth (HT-ESSEL). The vegetation density is modeled by an exponential dependence on LAI, based on the Lambert-Beer formulation. Retrospective hindcasts have been performed with the following model setup: 7 months forecast length, 2 start dates (1st May and 1st November), 10 members, 28 years (1982-2009). Initial conditions were produced at IC3, based on ERA-40/ERA-Interim (atmosphere and land-surface) and NEMOVAR-ORAS4 (ocean and sea-ice) data. Model resolution is T159L62 for the atmosphere and the ORCA1 grid for the ocean. The effect of the realistic LAI prescribed from observation is evaluated with respect to a control experiment where LAI does not vary. Results of the retrospective hindcast experiment demonstrate that a realistic representation of vegetation has a significant effect on evaporation, temperature and precipitation. An improvement of model sensitivity to vegetation variability on the seasonal scale is also evidenced, especially during boreal winter. This may be attributed in particular to the effect of the high vegetation component on the snow cover.