



Does potential predictability improve with seasonal vegetation?

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In recent potential predictability studies, higher values with regards to surface air temperature were found predominantly over mid- to high latitude oceans (e.g. Boer, 2004; Boer and Lambert 2008), and in the North Atlantic region (Pohlmann et al., 2004) with only weak signals over land in all of the studies.

Anthropogenic interference with the climate system, however, e.g. related to land use, takes place mainly over land, and also societal interest in climate predictability is greater for land areas.

In this study we therefore seek to analyse if an improved representation of land surface properties increases monthly and seasonal potential predictability of surface air temperature. A prescribed leaf area index climatology in the earth system model EC-Earth is replaced with monthly values from MODIS for the period 2001-2008 and in a further step, albedo is adjusted appropriately.

Potential predictability is then assessed by applying the methods of “ prognostic potential predictability” (PPP) and “diagnostic potential predictability” (DPP) to an ensemble of 10 members for both the control run and the experiment run (Pohlmann et al., 2004, Kumar et al., 1996). DPP is calculated by quantifying the fraction of internally generated variability that can be attributed to the interaction of physical processes within the climate system in contrast to unpredictable internal non-linearities, i.e. noise. PPP is calculated from the experimental ensemble variance in comparison to the control ensemble variance.

As such, potential predictability (DPP and PPP) represents an upper limit of skill that might be attained. The actual gain in predictive skill is thereafter quantified by comparison with the ERA interim dataset.