Sensitivity of land surface simulations to the treatment of vegetation properties and implications for seasonal climate prediction

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The Second Global Soil Wetness Project (GSWP-2) is an initiative to produce and evaluate 10-year simulations by a broad range of land surface models under controlled conditions. An essential component of GSWP-2 involves the production of a suite of sensitivity studies by each participating land surface scheme (LSS) where forcing data or boundary conditions are altered to test the response of the models to uncertainties in those parameters. In this study, the sensitivity to choice of mean seasonal cycle versus time-varying vegetation parameters (LAI, FPAR, and greenness fraction) has been analyzed for several LSSs over the 10-year period. The impact of alternative surface vegetation data sets on model simulations of surface fluxes and state variables has been assessed. We also investigate the same sensitivity scenario with one of the LSSs coupled to an atmosphere climate model in order to understand the role of land-atmosphere feedbacks in the response of the land surface to vegetation phenology variability. These studies, if they show importance of vegetation for monthly-seasonal climate, would emphasize the need for near real-time continuous global monitoring of vegetation (by satellite) for subseasonal-seasonal climate prediction.