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# Coupling of Integrated Biosphere Simulator to Regional Climate Model version 3

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An assessment of Integrated Biosphere Simulator (IBIS) coupled to Regional Climate Model version 3 (RegCM3) is presented. RegCM3 is a 3-dimensional, primitive equation, limited area model used throughout the world for seasonal predictability and regional climate studies. IBIS is a dynamic global vegetation model that includes representations of land surface processes, canopy physiology, vegetation phenology, terrestrial biogeochemistry, and vegetation dynamics.

A single subroutine was created that allows RegCM3 to use IBIS instead of Biosphere-Atmosphere Transfer Scheme 1e (BATS1e) for surface physics calculations. In addition to coupling the two models, a revised initialization scheme was implemented for RegCM3-IBIS, including an IBIS specific prescription of vegetation and soil types, as well as a new scheme for initializing soil moisture, soil ice, and soil temperature based on simulations using the offline version of IBIS.

A series of six 1-year numerical experiments were completed to assess the ability of RegCM3-IBIS to simulate the energy and water budgets, as well as surface temperature. The evaluation of RegCM3-IBIS was primarily based on NCEP reanalysis data, and when available, NASA Surface Radiation Budget data. While RegCM3-IBIS shows reasonable agreement with observations and reanalysis, a deterioration in the ability of RegCM3-IBIS to simulate, most notably, 2 m temperature and latent heat flux, is observed with respect to RegCM3 using BATS1e. However, many aspects of the RegCM3-IBIS results are encouraging, and the problems seen in the untuned version of RegCM3-IBIS are likely to be resolved given further analysis and tuning of parameters.