

Sensitivity to changes in soil moisture and land use over the Gran Chaco Region.

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The feedback between soil moisture and regional climate in the Gran Chaco region (a region that covers the Northeast of Argentina, East of Bolivia, most of Paraguay and a small part of Brazil) is examined using the WRF mesoscale model which includes NOAH module as land model. The initial and boundary conditions are taken from The National Centers for Environmental Prediction (NCEP) Global Data Assimilation System (GDAS) analysis. Sensitivity experiments with different initial soil moisture conditions and land uses were conducted for several 15-day period during the spring-summer season of 2009-2010. Five experiments were performed, a control run, an increasing and decreasing soil moisture run by 50 % over the studied region, an evergreen broad leaf run (from the USGS classification) and a grassland run. All these changes were made in the rectangle representing the Gran Chaco region. A strong sensitivity of the precipitation to land use changes and initial soil moisture conditions is found. The precipitation decreases over the Gran Chaco Region for the grassland simulation compared to the evergreen broad leaf simulation. The mean precipitation differences between the evergreen broad leaf and the grassland case show a dipolar pattern with a positive response, i. e. an increase of precipitation for the evergreen broad leaf case, located to the north of the forcing region. This difference in the precipitation is stronger when the low level jet is a Chaco Jet event. One explanation for this response is that the increase of the convection in the forcing region produces an increase of the subsidence which explains the dipolar pattern in the precipitation differences.