Hydroclimatic Impacts of Crops Expansion in Argentina

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1. Motivation

Large areas of South-eastern South America are undergoing changes in the land use.

The “Chaco Seco” region has undergone a process of deep deforestation reaching the global absolute maximum deforestation rate.

The “Pampa Húmeda” region has shown a clear trend towards intensive soybean agriculture, replacing natural vegetation or other crops.

The replacement of natural vegetation by crops modifies the biophysical properties and therefore the soil-atmosphere interaction:

It affects local hydroclimate... but ¿Can it alter the hydroclimate on remote areas?

2. Goal

Investigate the remote effects of the expansion of agriculture occurred in southern South America in the last 30 years on the regional climate using the coupled model Weather Research and Forecasting (WRF)

3. Methodology

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PHASE 1: Determine the changes of native vegetation cover occurred in Argentina in the last 30 years through remote sensing.

PHASE 2: Simulate with a ~10 km resolution different scenarios with the different degrees of modification of the native vegetation: past, present and future, with the coupled model WRF.

PHASE 3: Analyze the effects of crop expansion on the biophysical properties associated with soil cover that are used in the simulations to be carried out.

PHASE 4: Evaluate the effects on the regional climate derived from the change of biophysical properties paying special attention to non-local effects.

4. Preliminary Results

Those regions where a change in coverage occurred...

... without deforestation? ... with less deforestation? ... with greater deforestation?

... will modify their biophysical properties, while unchanged regions will keep them...

... however, important changes in water balance are found in regions that hold on the coverage

5. References


6. Acknowledgments

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