

Remote effects in the South-eastern South America climate of land use change

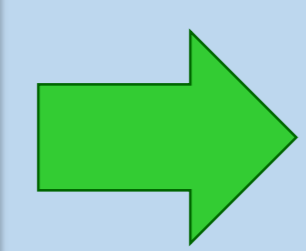
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1. Land use changes

- Large areas of South America are undergoing changes in the land use.
- The replacement of natural vegetation by crops modifies the soil –atmosphere interaction.



This affects local hydroclimate...
¿And in remote areas?



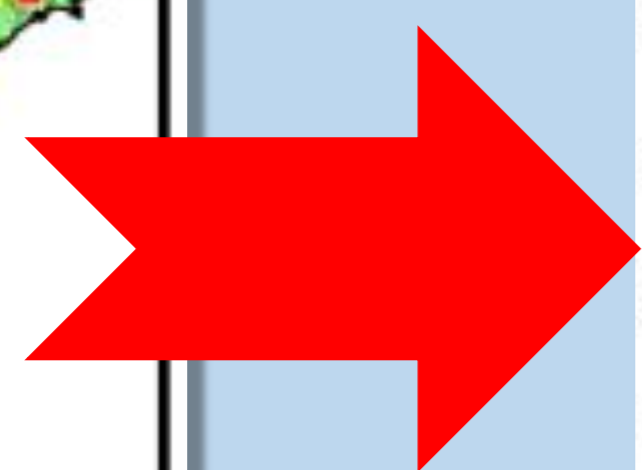
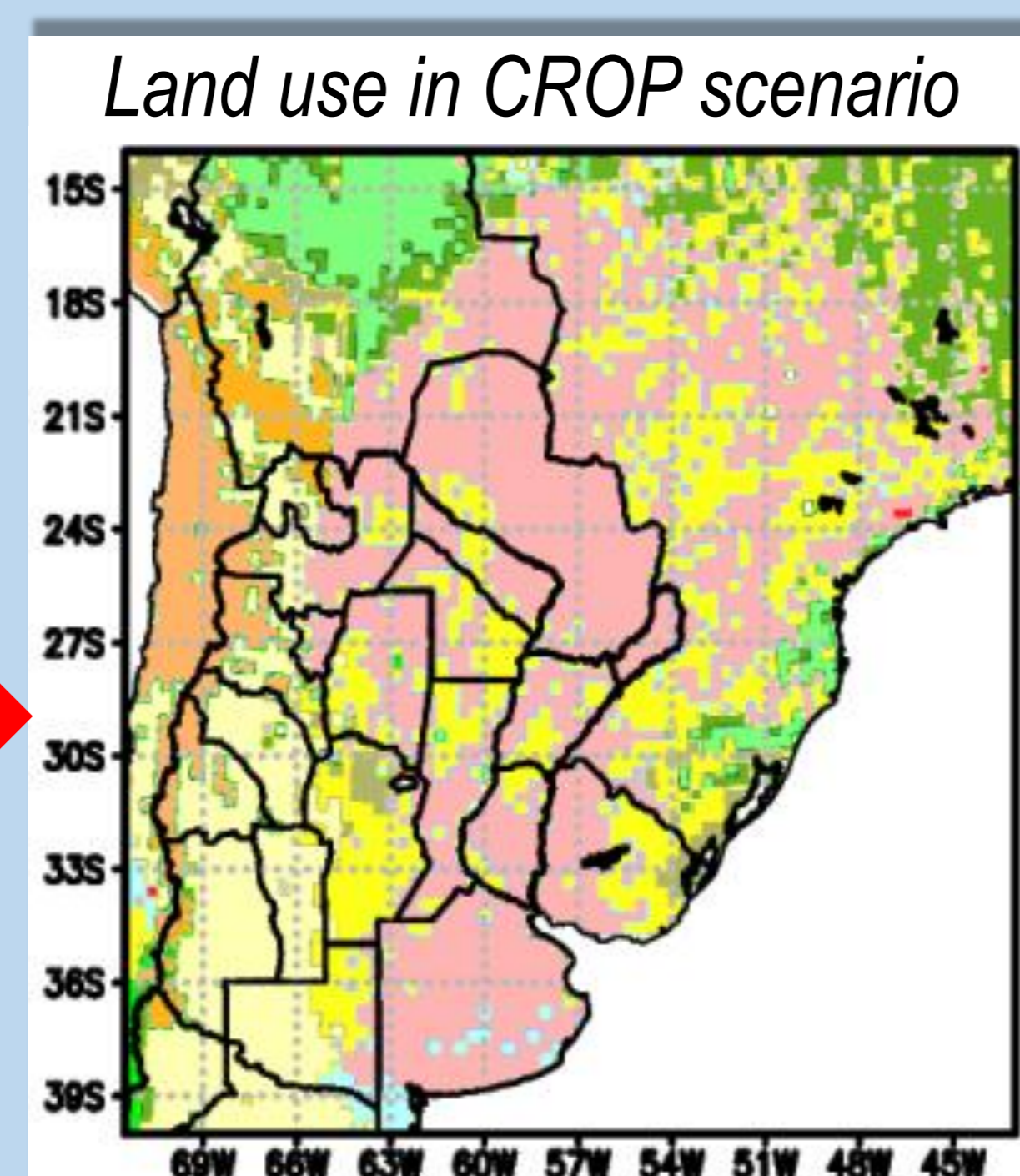
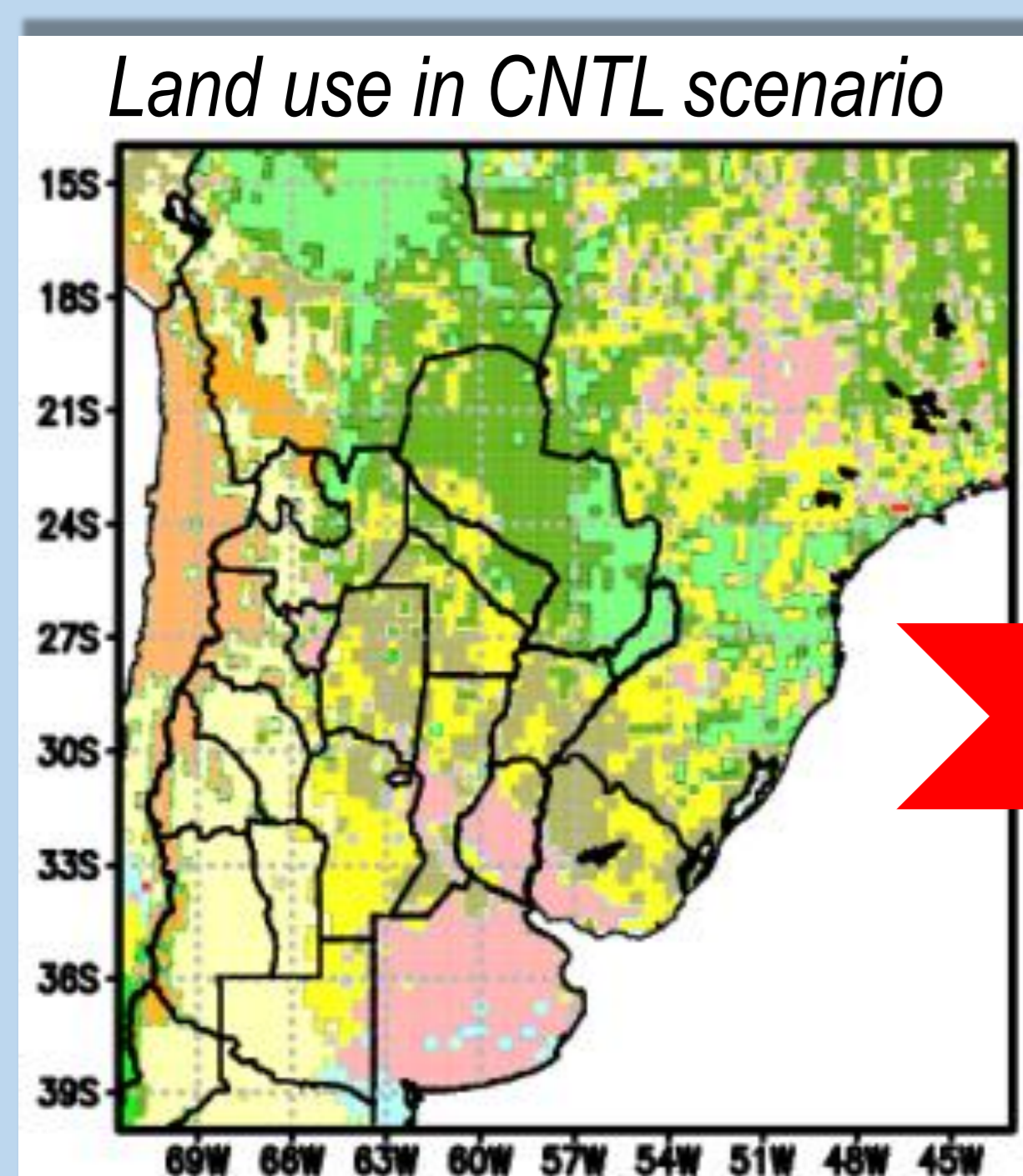
2. Experiments

Simulations were carried out using the WRF regional climate model, assuming two scenarios of land cover / use:

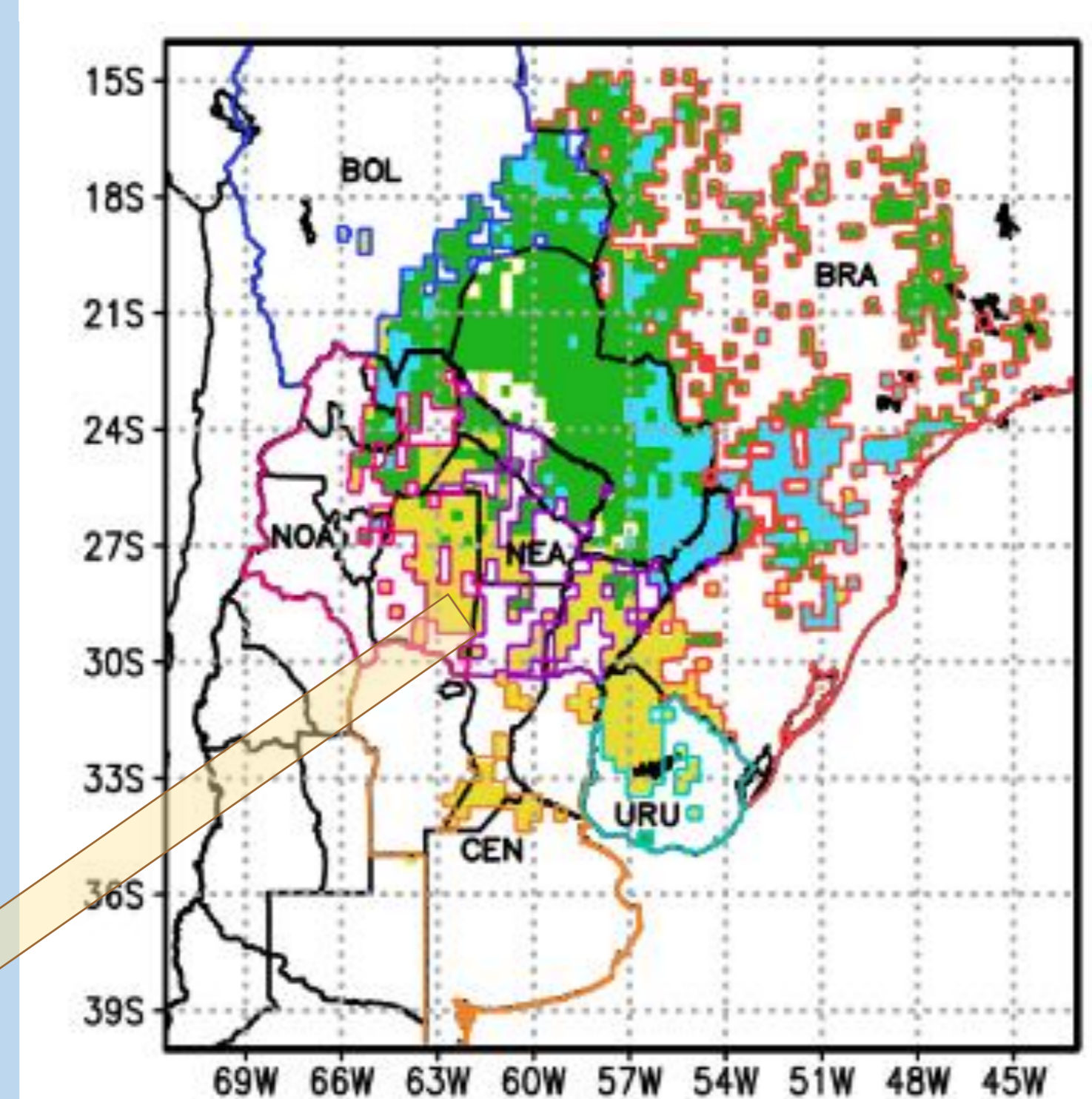
- Period: September 2002 – November 2002.
- Domain: South America.
- Two simulations were compared

CNTL: control simulation.

CROP: replaces forests, grasslands and savanna by crops.



Remote areas to be evaluated



- Savanna → Dryland cropland
- Grassland → Dryland cropland
- Evergreen broadleaf forest → Dryland cropland

Remote areas to be evaluated

BRA
BOL
URU
NOA
NEA
CEN

4. Conclusions

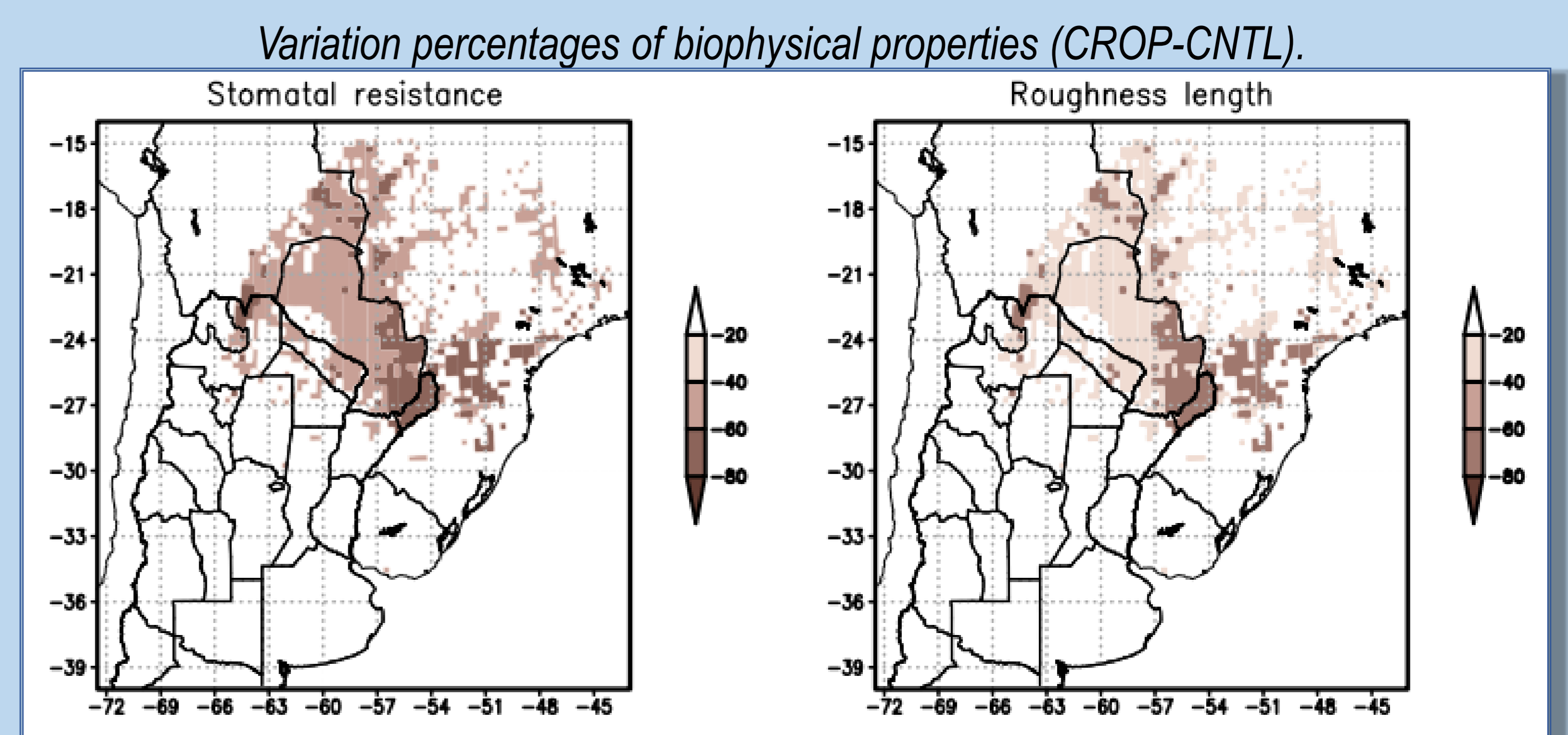
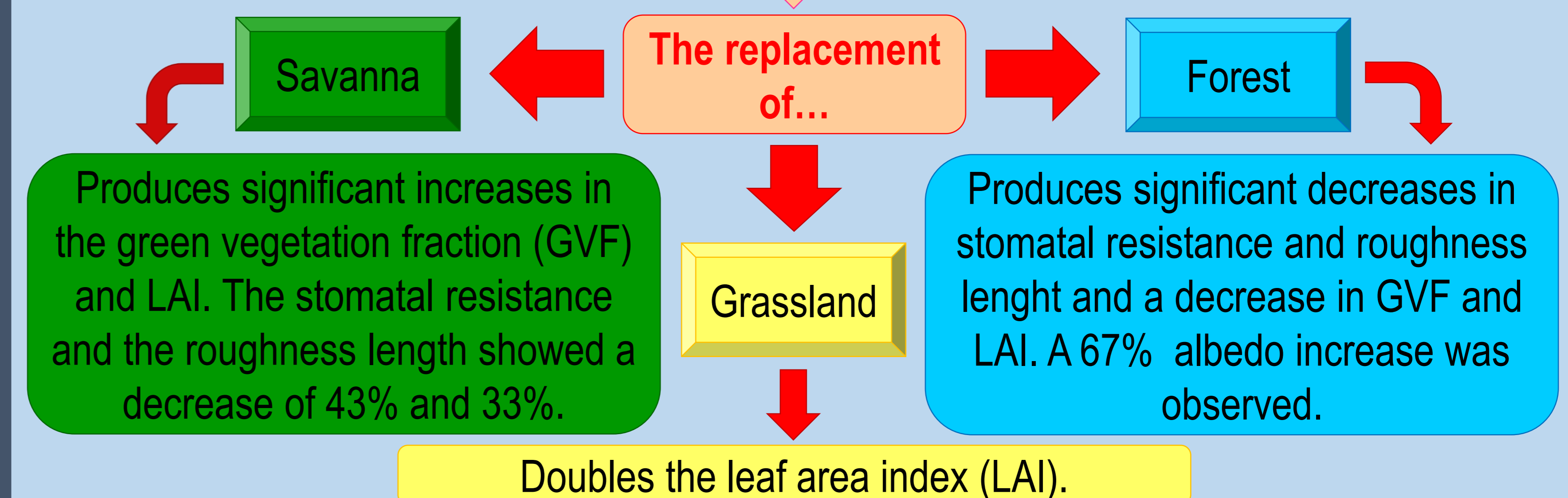
- The expansion of crops on native vegetation modifies the biophysical properties: leaf area index, albedo, roughness length, among others.
- Land cover changes produce effects in remote areas by altering (in time and space) the behavior of hydroclimatic variables.

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3. Results

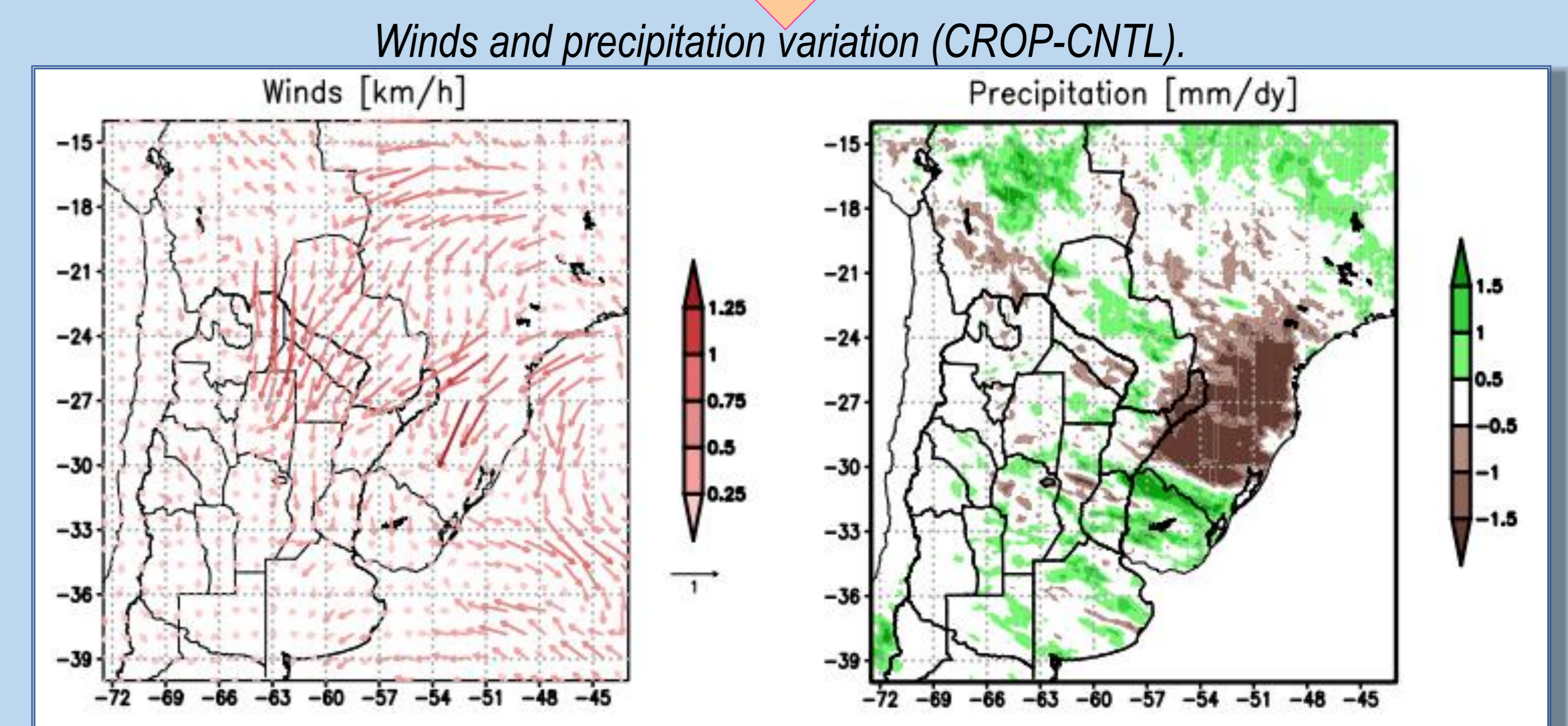
Biophysical properties variations:

Those regions where a change in coverage occurred will modify their biophysical properties, while unchanged regions will conserve them.

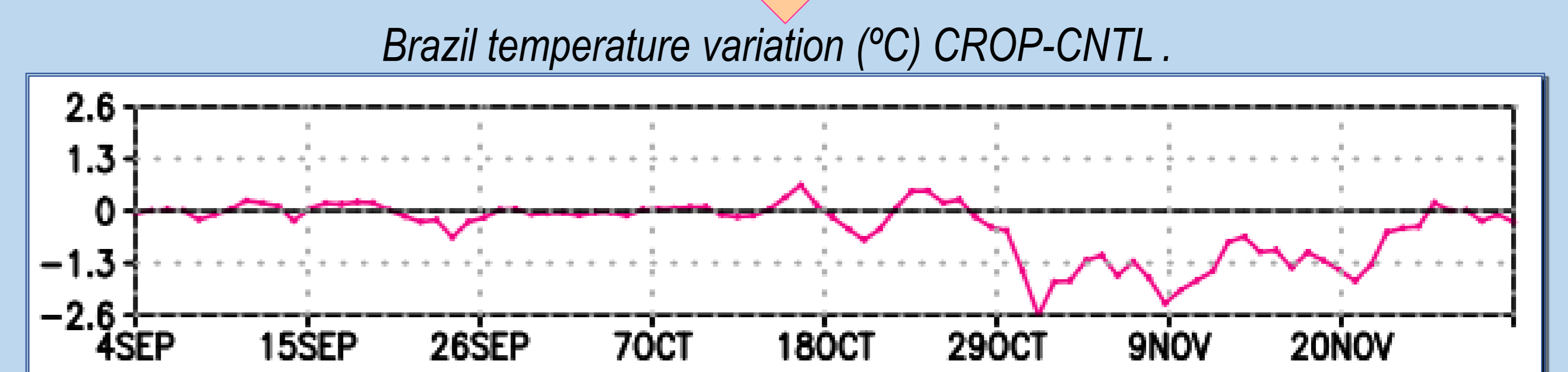


Hydroclimatic variables variations:

Changes in biophysical properties induce changes in hydroclimatic variables in regions where there were no alterations in the coverage ...



... that become more evident as the simulation time advances.



Percentages of variation of the averaged variables in the last month of simulation.

Region	Precip. (%)	EVT (%)	Soil moisture at 1m (%)	Runoff (%)	Temp. (%)	Winds (%)
Bolivia	2,4	5,0	5,8	11,0	-2,7	-5,6
Brasil	-15,1	5,9	6,0	-45,9	-3,5	21,1
Uruguay	55,5	-2,8	0,3	3,1	0,6	-2,1
Centro	16,0	-0,3	2,4	13,2	1,1	2,5
NOA	1,2	-2,5	0,1	-1,3	0,5	1,4
NEA	-2,5	1,1	0,8	16,4	3,1	-0,3