

Mov365d and Annual Total Precipitation Climate Change Indices

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Introduction

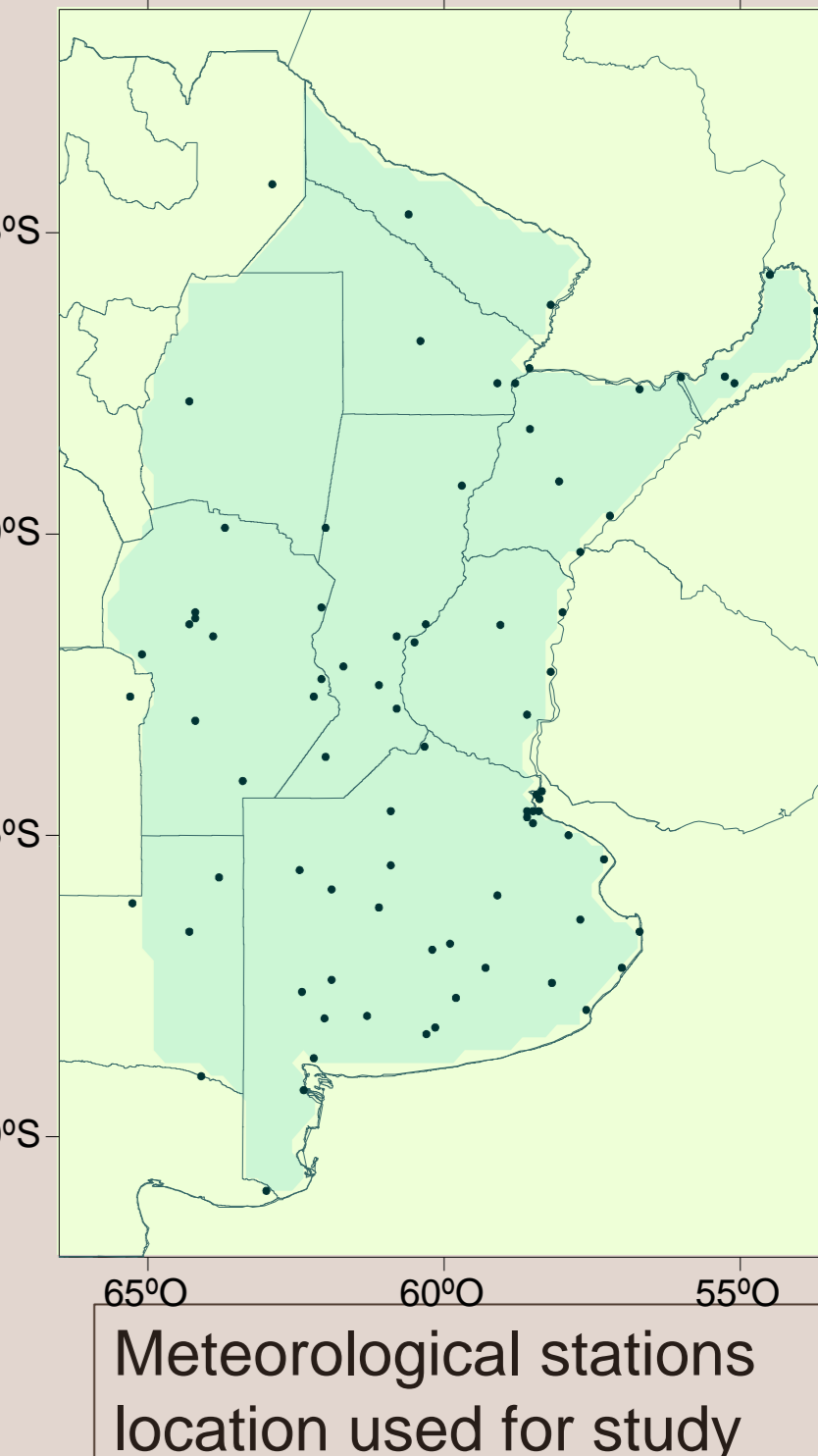
Climate changes and, particularly, changes in extreme weather events have significant impacts on society. Therefore, demands for information services on weather and climate extremes is growing. Most decision-making about water management and new infrastructure design base on historical information on weather and climate extremes. For this reason, historical extremes should be known as best as possible. Typical climate indices focused on extremes describe particular characteristics of out-of-range records.

Aim

To show Mov365d index ability to register occurred extremes in precipitation that PRCTOT index actually filters out.

Data used

Climatic period: 1981-2010
Area of study: Rainfed region of Argentina
Source: 82 meteorological stations; data provided by the SMN



Methodology

Study of accumulated rain amounts:

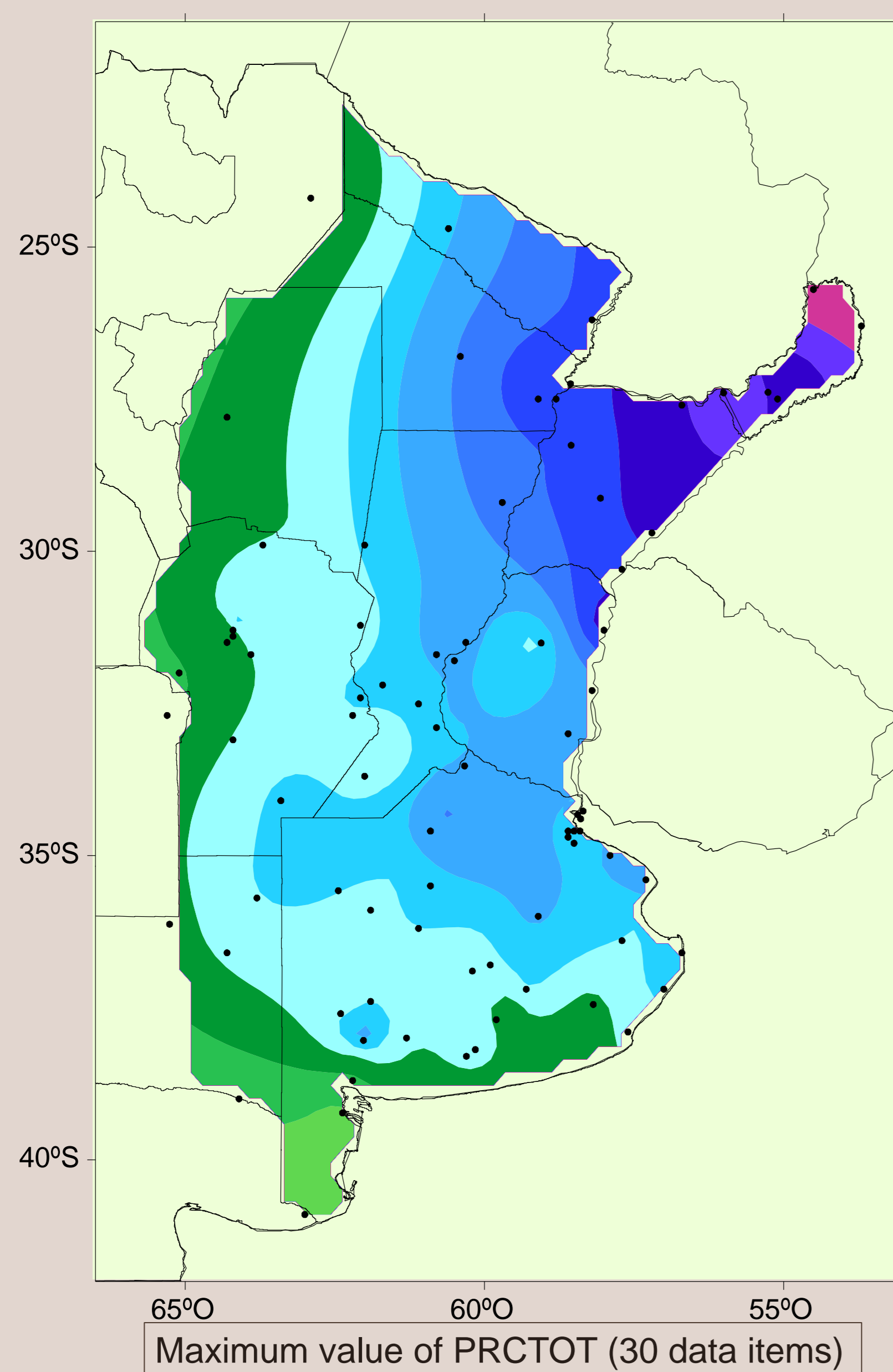
- Maximum value registered for each location in the area of study*
- Time evolution along 1981-2010 period for several selected localities

- PRCTOT: Total annual accumulated precipitation up to 31 December of each year. PRCTOT gives one value per year.
- Mov365d: Accumulated precipitation of each day plus the 364 previous days. Mov365d provides a 365 (366) values series in each non-leap (leap) year.

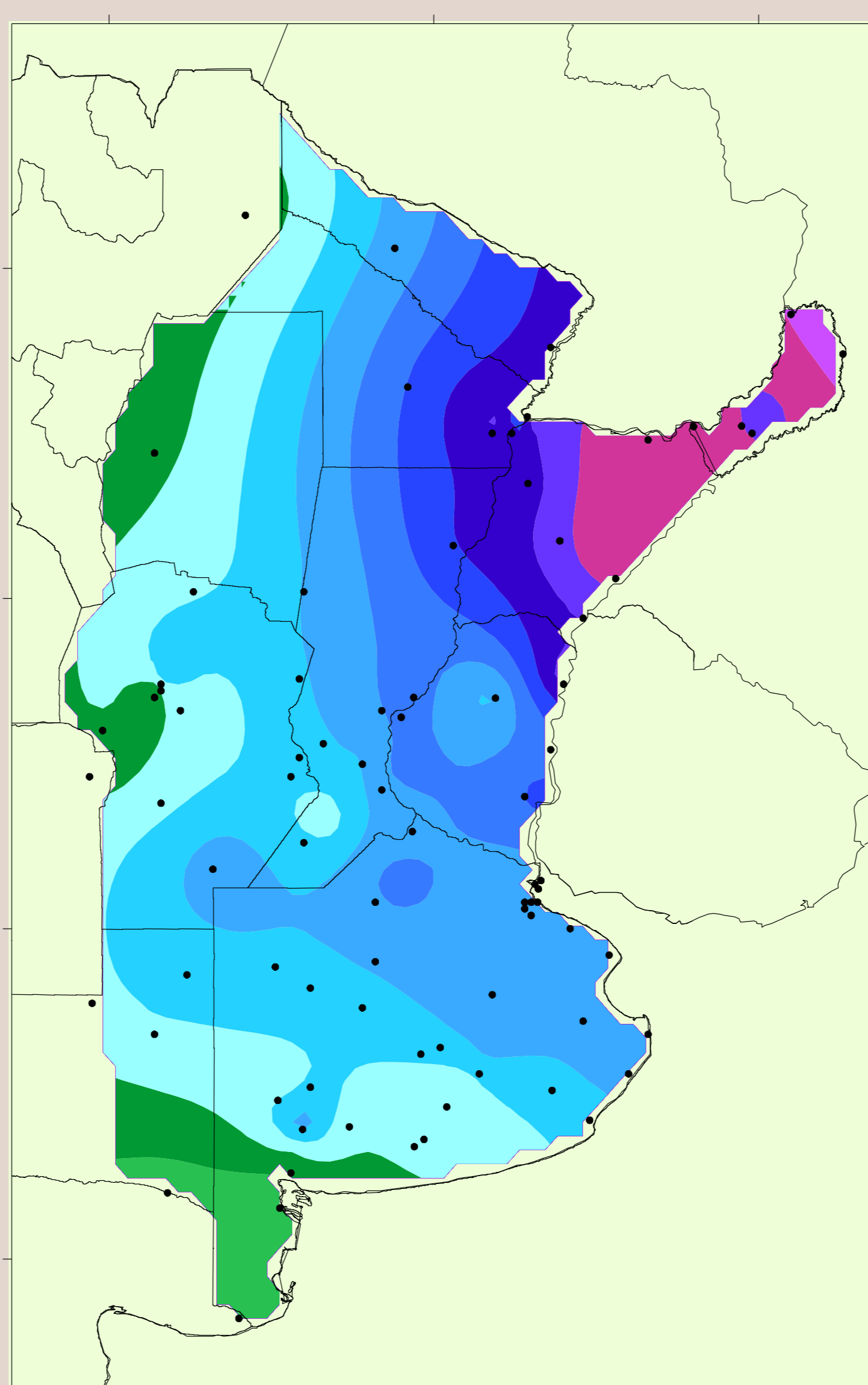
*spatial analysis valid only at the station locations

Results

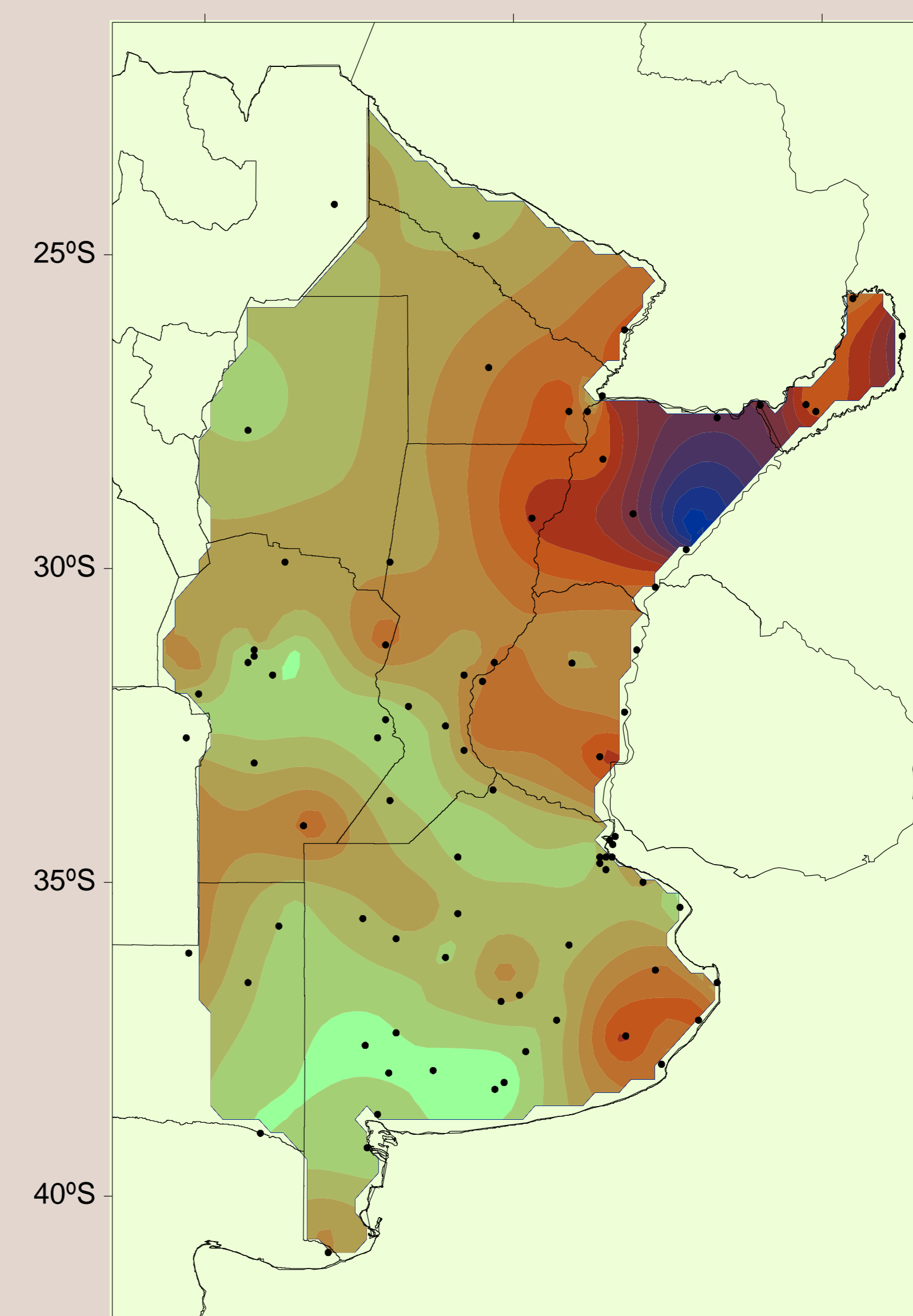
Spatial Analysis



Maximum value of PRCTOT (30 data items)



Maximum value of Mov365d (10957 data items)



Max Mov365d minus Max PRCTOT

✓ Max PRCTOT range: 650 to 3105 mm

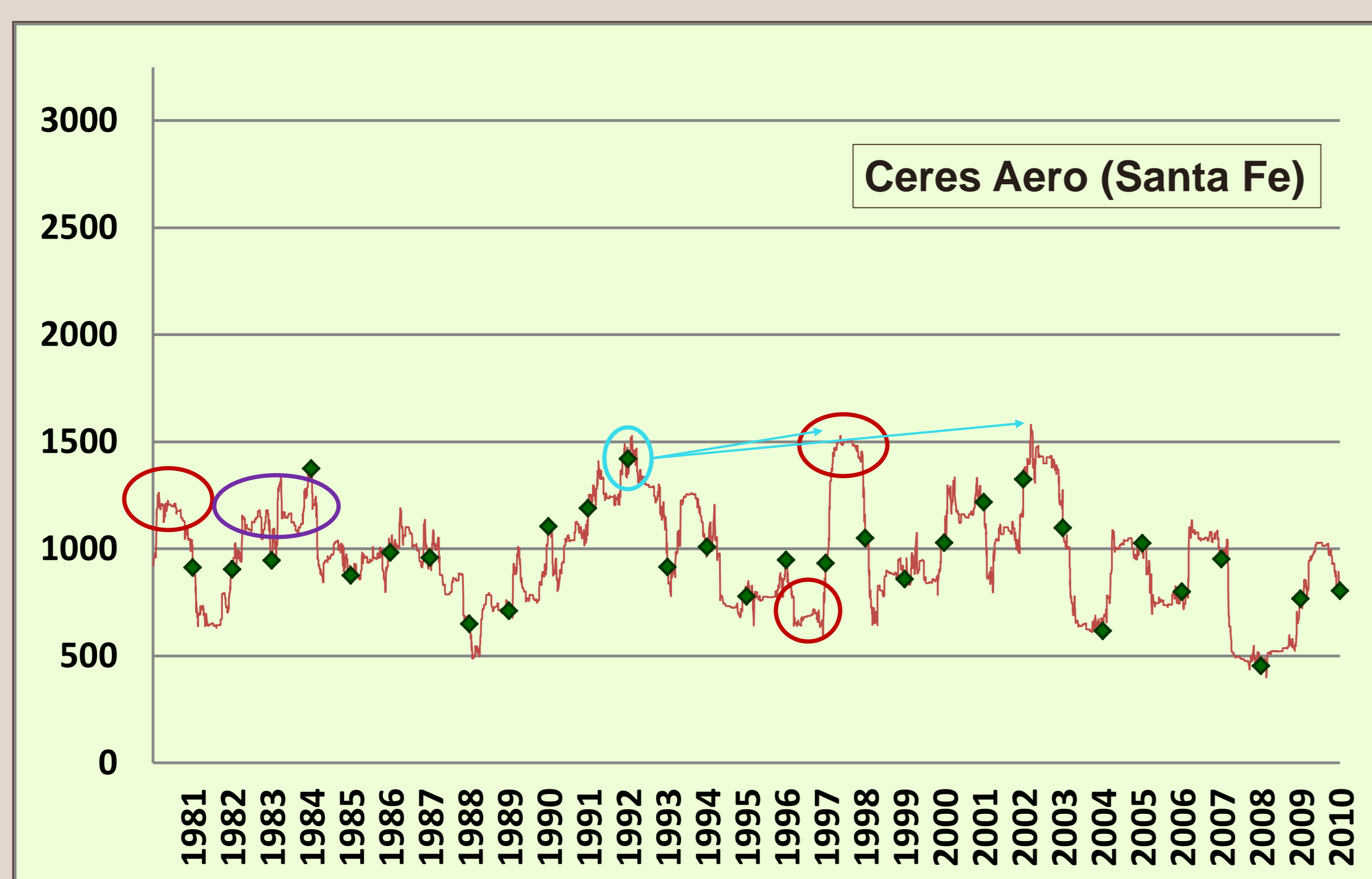
✓ Max Mov365d range: 715 to 3561 mm

✓ Difference range: 0 to 753 mm

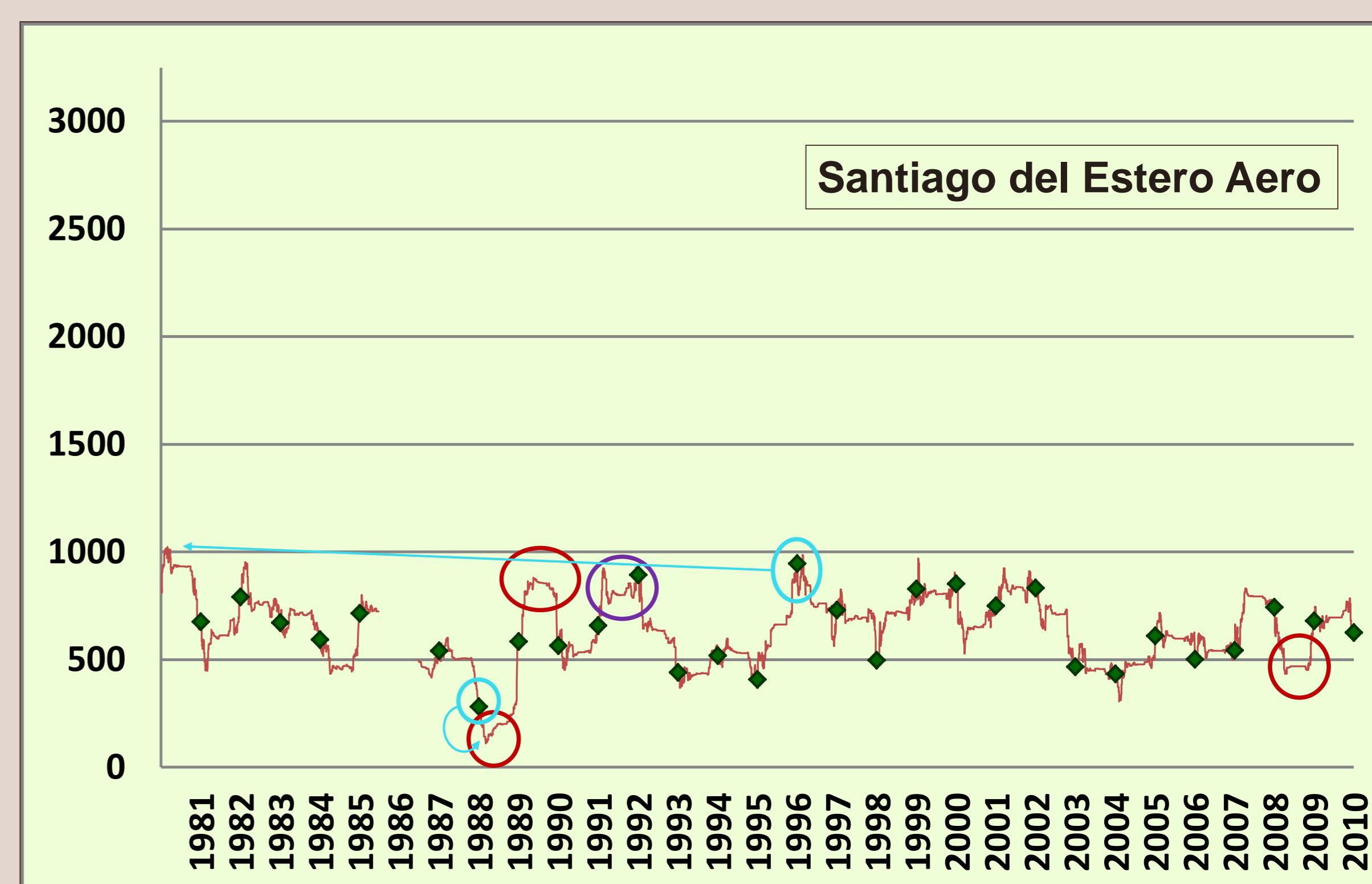
✓ Displacement of the isolines to the southwest from PRCTOT map to Mov365d one.

✓ Difference over 250 mm in the Northeast extreme

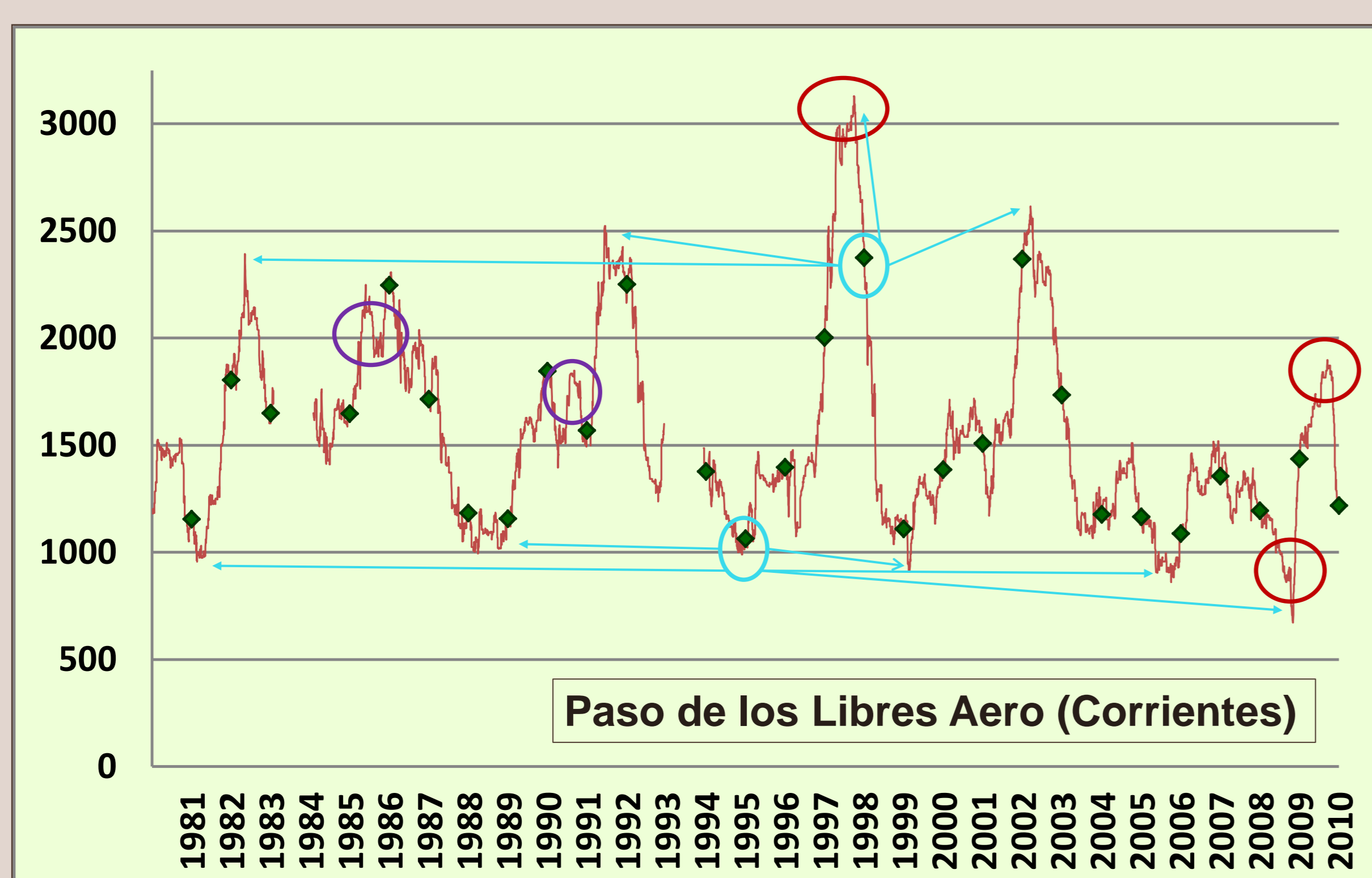
Mov365d and PRCTOT accumulated precipitation time evolution for some selected stations



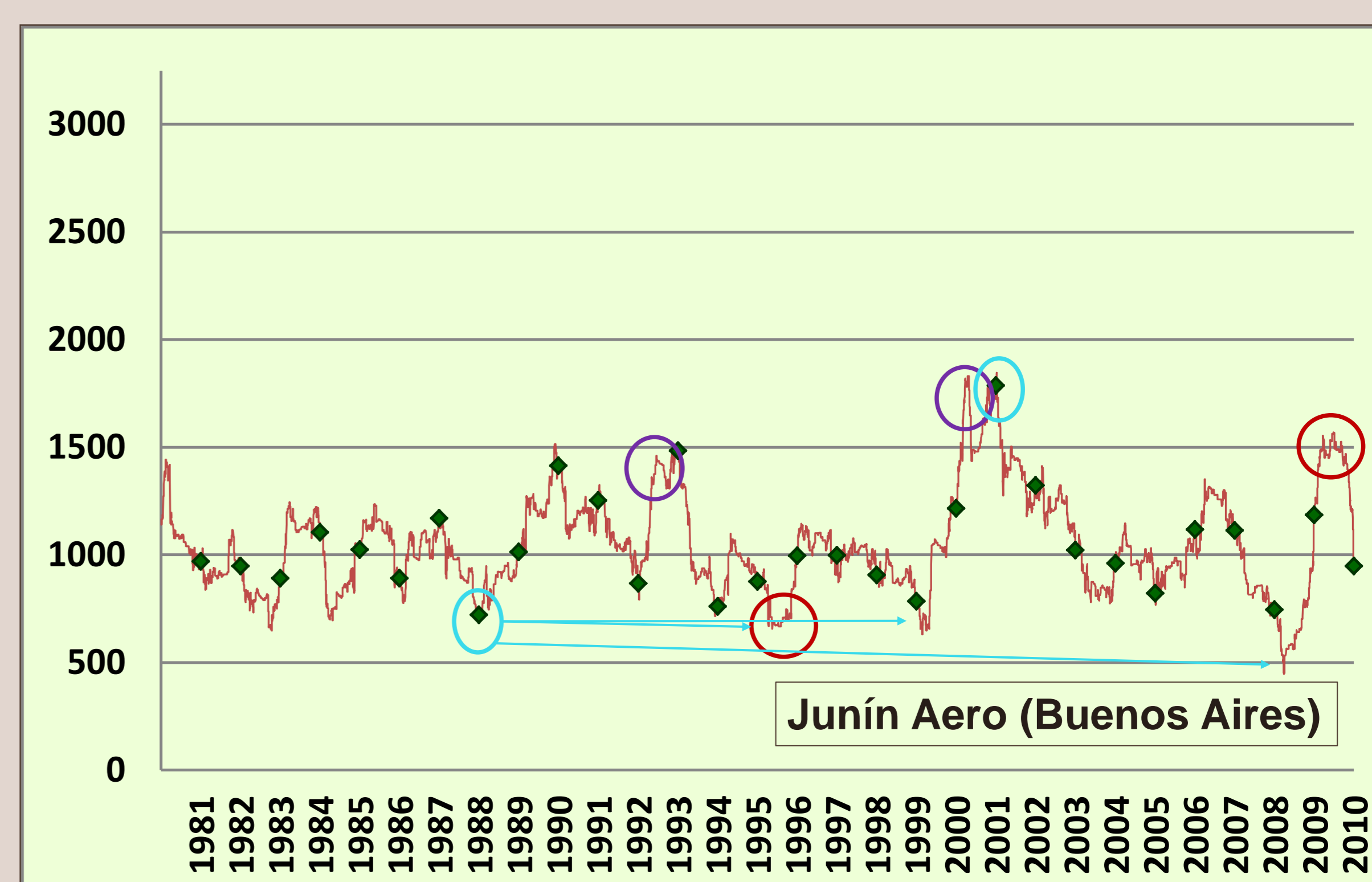
Ceres Aero (Santa Fe)



Santiago del Estero Aero



Paso de los Libres Aero (Corrientes)



Junín Aero (Buenos Aires)

Absolute maximum (minimum) registered by Mov365d are underestimated (overestimated) by PRCTOT.

Mov365d shows important extremes unnoticed by PRCTOT.

Daily data show intra-annual variability which is hidden if only annual data are used.

Conclusions

- ✓ Mov365d index provides actual accumulated amount of precipitation, no matter the moment of the year in which it takes place.
- ✓ Time series of Mov365d show extremes that remain unnoticed for PRCTOT.
- ✓ **Historical absolute extremes maximum or minimum identified by PRCTOT are less extreme than Mov365d ones.**
- ✓ Daily data of Mov365d give notice of intra-annual evolution of the variable, such as long wet or dry periods.