Strong South America low-level jet events characterization and implications for enhanced precipitation

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Intensification of the mutual dependency between extreme precipitation and moisture flux convergence in the exit region of the low-level jet in continental latitudes to the east of the Andes between 25ºS and 40°S (already found) depends on the incidence of events that penetrate farther south from the SALLJ mean maximum. Nicolini and Saulo (2000) commenced exploring this hypothesis and characterized Chaco jets (CJE) as extreme events of humidity transport toward this region during the southern hemispheric warm season of 1997-1998.

The objectives of the present work are:

- Extend the study of this hypothesis to characterize the Chaco events during the warm season using the (ERA) reanalyses.
- Find implications for enhanced accumulated precipitation in the interest area.
- Compare the two SALLJ subensambles: Chaco and non Chaco

Stronger winds during CJEs in a broad region extending toward the southeast of maximum wind speed.

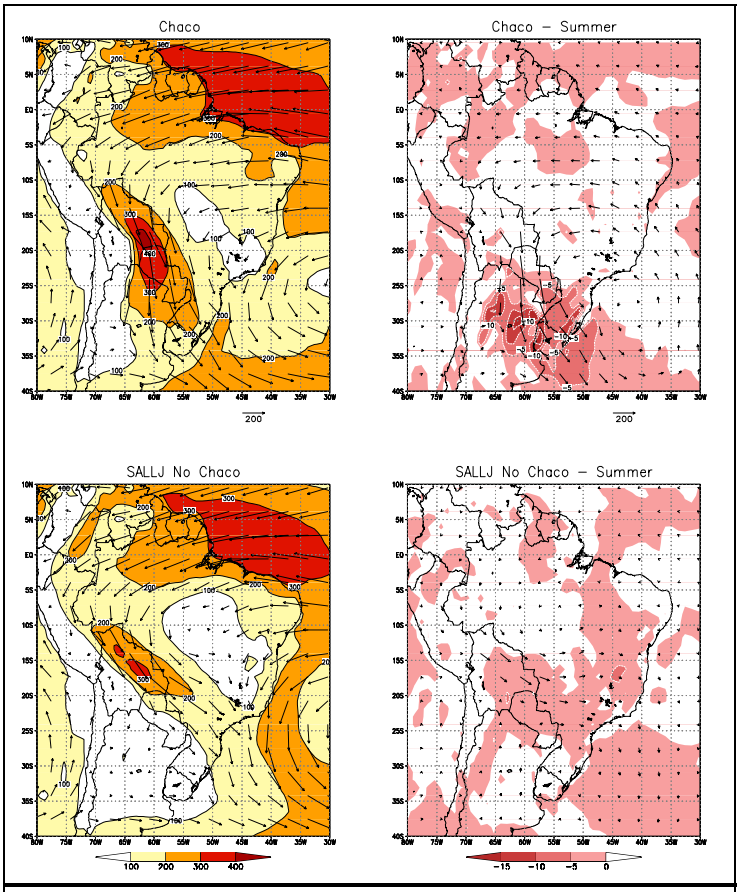

Figure 1: Vertically integrated moisture flux for Chaco Jet Events (upper left panel) and SALLJ - No Chaco Events (lower left panel). Vertically integrated moisture flux convergence anomaly for Chaco Jet Events (upper right panel) and SALLJ - No Chaco Events (lower right panel).

Deeper continental thermal-orographic low during the Chaco events with a better defined thermal structure implying an increase in the northerly to northwesterly geostrophic wind at 850 hPa.

During CJEs moisture flux convergence at low and mid levels within the southeastern South America is about 10 times more intense than the summer mean with a dominant contribution by the northerly flux through the northern border of this region.

Precipitation during CJEs is associated with a deep convectively unstable layer east of the Andes, and a wide layer of strong low-level moisture flux convergence related to the deceleration of the jet (figure 1).

Although the CJEs only represent 17 per cent of the austral summer days, they account for a significant fraction of the precipitation (a maximum of 55%) over northeastern Argentina (Figure 2).

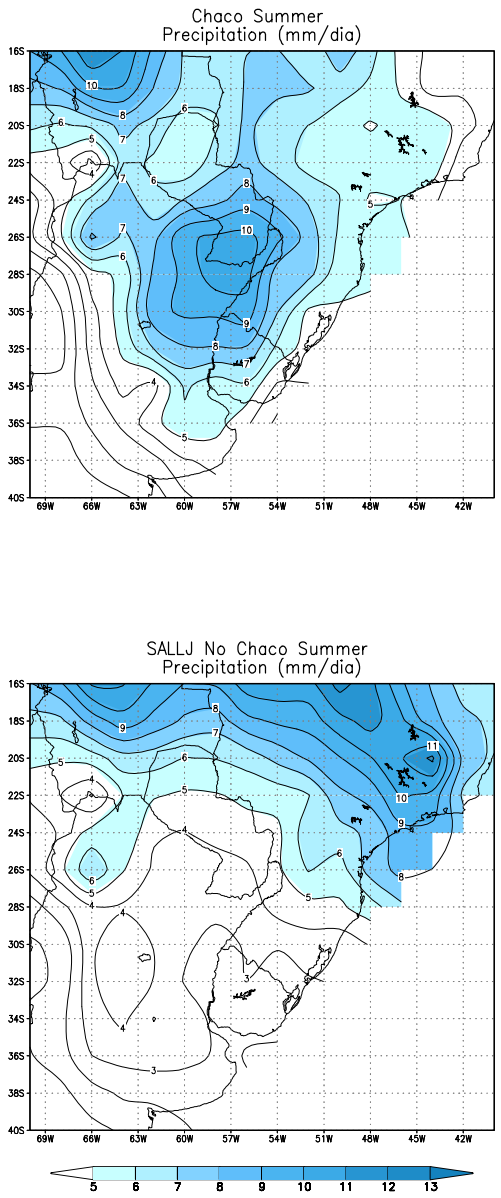

Figure 2. Daily accumulated precipitation for Chaco Jet Events (upper panel) and SALLJ – No Chaco Events (lower panel).