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## A quantitative evaluation of the role of the Argentinean Col and the Low Pressure Tongue East of the Andes for frontogenesis in the South American subtropics

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**Abstract.** Previous studies have found the South American subtropics to exhibit high climatological frontogenesis in equivalent potential temperature during the austral summer. An important contribution to this pattern is given by frontogenesis over the Argentinean Col (AC), which separates the Northwestern Argentinean Low (NAL) from transient troughs to the south of it. The NAL and the Low Pressure Tongue east of the Andes (LPT) promote efficient transport of Amazonian humidity to the subtropics during the incursion of transient disturbances over the continent. The convergence of this strong warm and humid flow with mid-latitude air brought into the subtropics by the disturbance occurs preferentially in the neighborhood of the AC. The main difficulty in quantifying the contribution of the NAL, AC and LPT structure to frontogenesis in the South American subtropics is the automatic detection of the AC and LPT. In this paper an algorithm developed to this end is briefly presented and applied to obtain statistics on the role of these structures in frontogenesis. Six-hourly data from ECMWF ERA-40 Reanalysis over 21 austral summer periods (December–March) is used. Occurrences of the AC are highly concentrated between 34–39° S and 66–69° W, being present in this region in 42% of the time instants analyzed. The spatial average of the positive values of the frontogenesis over this region was calculated for each time step as a measure of intensity and histograms were built for the cases when the AC was and was not found inside this region. Mean, median and mode are larger for the distribution of cases with the presence of the AC. In addition, we present the frequency of occurrence of the AC as a function of the frontogenesis, showing that it grows with the intensity of the frontogenesis, rising above the 0.955 quantile. We have not found any correlation between the AC frequency and the frontolysis intensity.

Full Article in PDF (PDF, 758 KB)

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