

Area Forecast Discussion: Punta Arenas and Resistencia

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Big Picture Perspective

The MJO position forecast changes slightly with the GEFS having it loop around phase 3 and 4 and other models suggesting significant weakening as it reaches phase 4. A high wavenumber continues to dominate the Southern Hemisphere allowing for low pressure systems to clip the southern tip leading to precipitation throughout the forecast. Another factor for precipitation in the southern tip is the atmospheric river that sets up mid forecast. Temperatures trend toward warmer than average on the southern tip do to continuous ridge building and mean northerly flow, that may be in response to the MJO pattern. On the other hand a cut off low formed from anticyclonic wave breaking keeps northern Argentina under temperatures that are below climatology. This cut off low seems to re-intensify as a lee cyclone from the Andes Mountains.

Extended Range: Day 7-10

In the extended period, the cyclone forming on the southern tip is forecasted to merge with the cut off cyclone from the Andes, making a very strong cyclone off the eastern coast as high surface pressure moves into central South America again. The southern tip will continue to have ridging for the majority of the period. About midway through the period, an anticyclone off the west coast and a trough moving in from the Pacific is forecasted to produce another atmospheric river bringing 3-4 sigma high precipitable water values to the southern tip. This will set up the environment for a strong cyclone to form in the inflection point between the trough and ridge, forced by the upper level divergence and cyclonic vorticity advection produced by a shortwave. The cyclone is forecasted to occlude just before reaching the southern tip, producing only light precip despite the strength of the cyclone.

Medium Range: Day 4-6

The general pattern over South America during this period is split into 3 separate regions. Northern South America will continue to have anomalously high precipitable water values during the period because of the low level onshore flow caused by the anticyclonic circulation to the east of Brazil. These high water vapor values combined with the diurnally driven instability will produce afternoon thunderstorms over the northern half of the continent. Central South America will have high precipitable water

values advected from the north as the surface anticyclone moves to the east. The anticyclone finally moving eastward will allow the cut off low over the Andes to descend into eastern South America. This will only serve to increase the northerly winds, bringing even more moisture and warm temperatures into the area, which will be forced by cyclonic vorticity advection to produce precipitation in Uruguay and southern Brazil. The southern tip will have a series of trough approach from the west during this period. The troughs are forecasted to weaken as they go over the southern tip due to the continuous attempted ridges that keep trying the build up. The southern tip will have warm anomalies associated with northerly flow on the western coast but will switch to cold anomalies at the end with southerly flow on the eastern coast. The southern tip will stay dry throughout much of the period before a trough moves in, allowing a frontal system to form.

Short Range: Day 0-3

A mesoscale convective system develops in the beginning of the forecast region over Northern Argentina and Uruguay along the N-S temperature gradient. Warm moist from the tropics is advected into the continent through a high pressure system to the east as well as from monsoonal flow. Large values of IVT through Argentina can be attributed to this flow regime as well as from Amazon moisture and northerly winds along the Andes Mountains. Another high pressure situated in the southern tip acts to bring cold polar air south, creating a strong baroclinic region. Large values of CAPE and low level conditional instability as shown through the theta-e profiles. Significant speed shear exists throughout the column with weak directional shear allowing for the MCS to develop. Divergence from the equatorward entrance region from the upper level jet is contributing to upward vertical motion as shown in the starburst pattern of the irrotational wind.

Probabilistic Forecast

Punta Arenas, Chile:

Day 0-3:

Max Temp: 12°C (10th), 14°C (50th), 17°C (90th)

Min Temp: 7°C (10th), 8°C (50th), 9°C (90th)

Precip: 5 mm (10th), 10 mm (50th), 20 mm (90th)

Day 4-6:

Max Temp: 11°C (10th), 12°C (50th), 13°C (90th)

Min Temp: 4°C (10th), 6°C (50th), 8°C (90th)
Precip: 3 mm (10th), 5 mm (50th), 12 mm (90th)

Day 7-10:

Max Temp: 11°C (10th), 12°C (50th), 14°C (90th)
Min Temp: 5°C (10th), 6°C (50th), 7°C (90th)
Precip: 4 mm (10th), 8 mm (50th), 10mm (90th)

Resistencia, Argentina:

Day 0-3:

Max Temp: 26°C (10th), 27°C (50th), 28°C (90th)
Min Temp: 18°C (10th), 19°C (50th), 20°C (90th)
Precip: 15 mm(10th),25 mm (50th),40 mm (90th)

Day 4-6:

Max Temp: 24°C (10th), 25°C (50th), 29°C (90th)
Min Temp: 18°C (10th), 20°C (50th), 21°C (90th)
Precip: 10 mm (10th), 15 mm (50th), 25 mm (90th)

Day 7-10:

Max Temp: 26°C (10th), 28°C (50th), 29°C (90th)
Min Temp: 18°C (10th), 19°C (50th), 20°C (90th)
Precip: 8 mm (10th), 15 mm (50th), 20 mm (90th)