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Supporting Information for

# ENSO-related precipitation variability in Central Chile: the role of large-scale moisture transport.

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## Introduction

This supplemental material provides additional calculations to support the relation between the large-scale moisture transport and precipitation in South-Central Chile and the statistical significance of the anomalies presented in the main text. Figure S5 supports the methodology for the 500 hPa transient perturbations calculation.

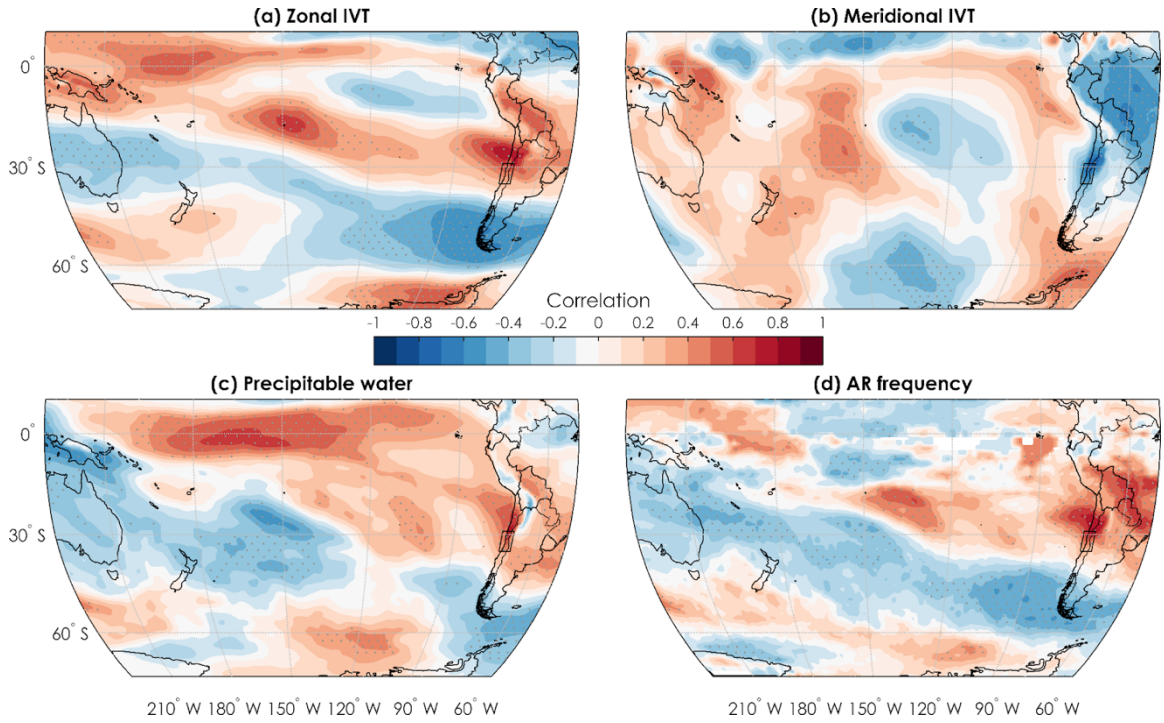


**Figure S1.** Composite of the interannual correlation (1979-2014) between the CN precipitation index and (a) zonal integrated water vapor transport uIVT, (b) meridional integrated water vapor transport vIVT, (c) PW, and (d) ARs frequency. Shaded area shows statistically significant correlations at the 95% level, according to a Monte Carlo test. Box over the map shows the location of CN zone.

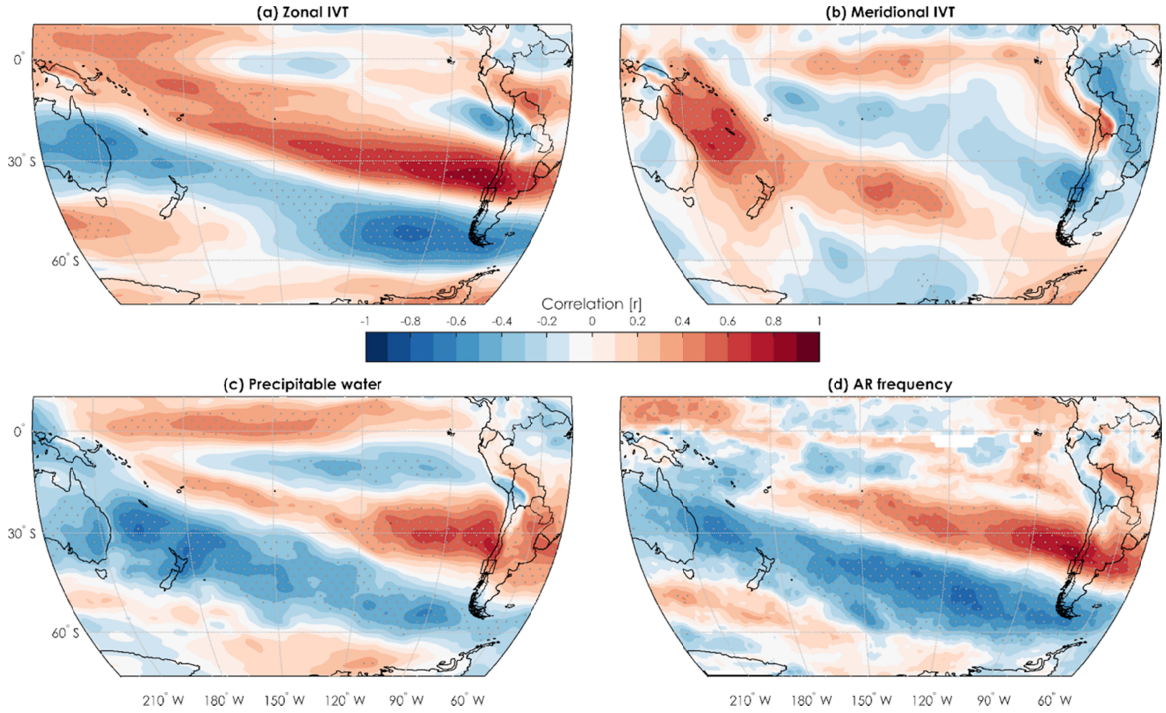


**Figure S2.** Composite of the interannual correlation (1979-2014) between the S precipitation index and (a) zonal integrated water vapor transport uIVT, (b) meridional integrated water vapor transport vIVT, (c) PW, and (d) ARs frequency. Shaded area shows statistically significant correlations at the 95% level, according to a Monte Carlo test. Box over the map shows the location of S zone.

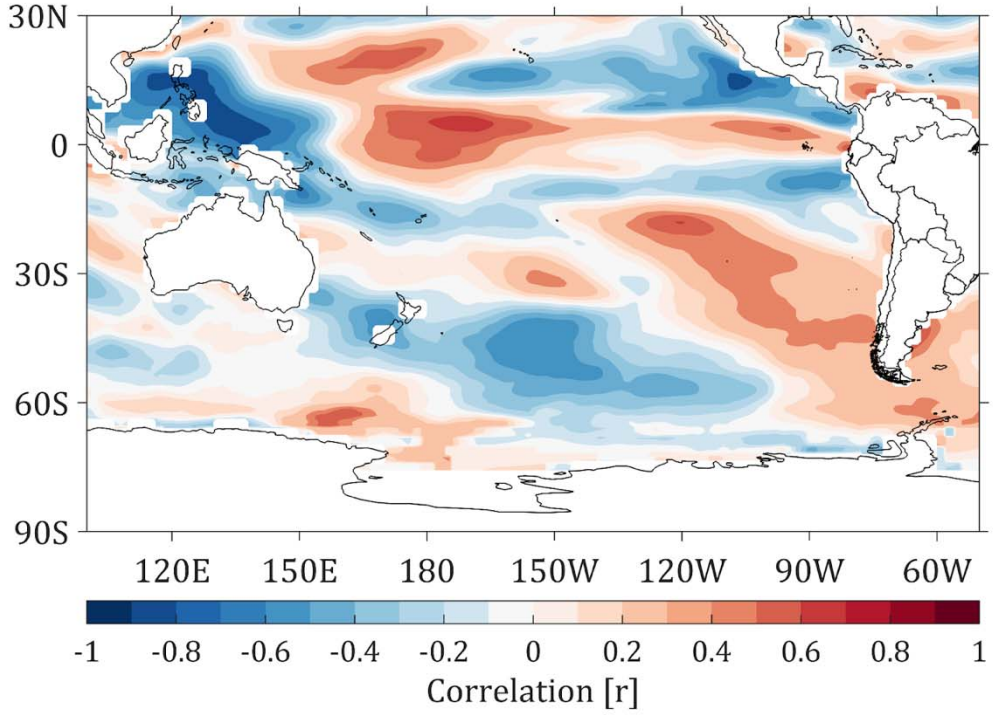


**Figure S3.** Composite of the interannual (1979-2014) correlation (point to point) between the sea surface temperature (ERSSTv5) and the zonal integrated water vapor transport uIVT.

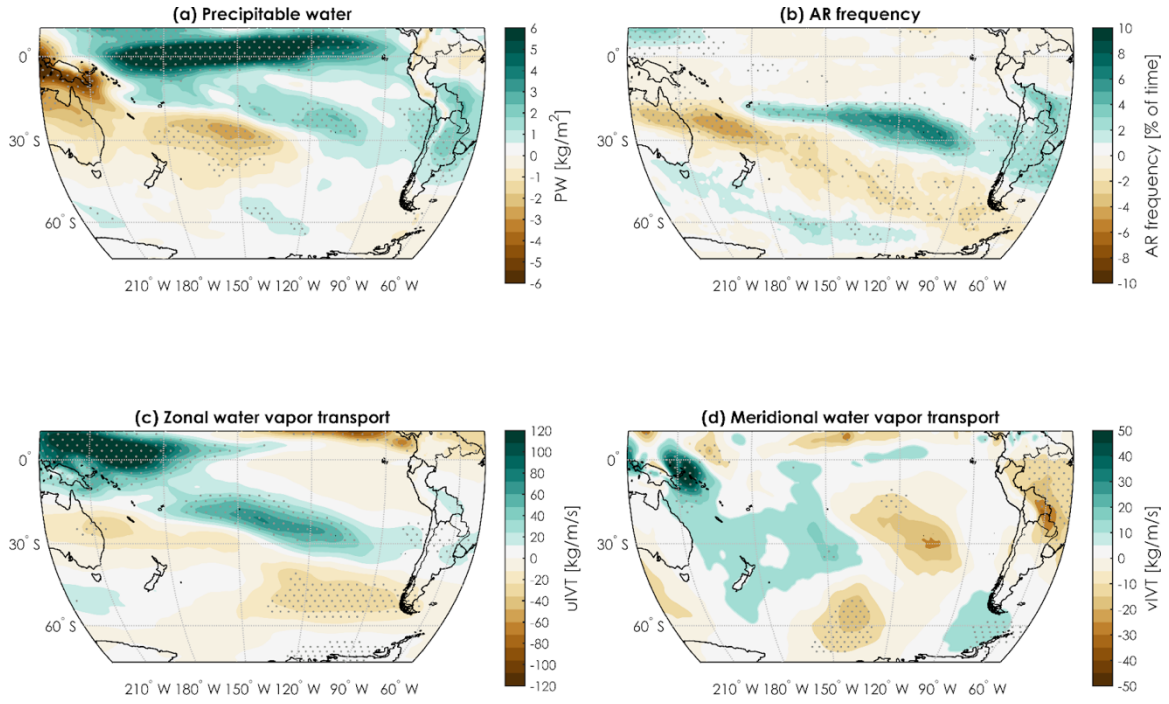


**Figure S4.** Anomaly composites for the JJA period in El Niño years. (a) precipitable water (kg/m2), (b) AR frequency (% of the time), (c) zonal water vapor transport uIVT (kg/m/s), and (d) meridional water vapor transport vIVT (kg/m/s). Shaded areas show statistical significance at 95% confidence, according to the t-Student test.

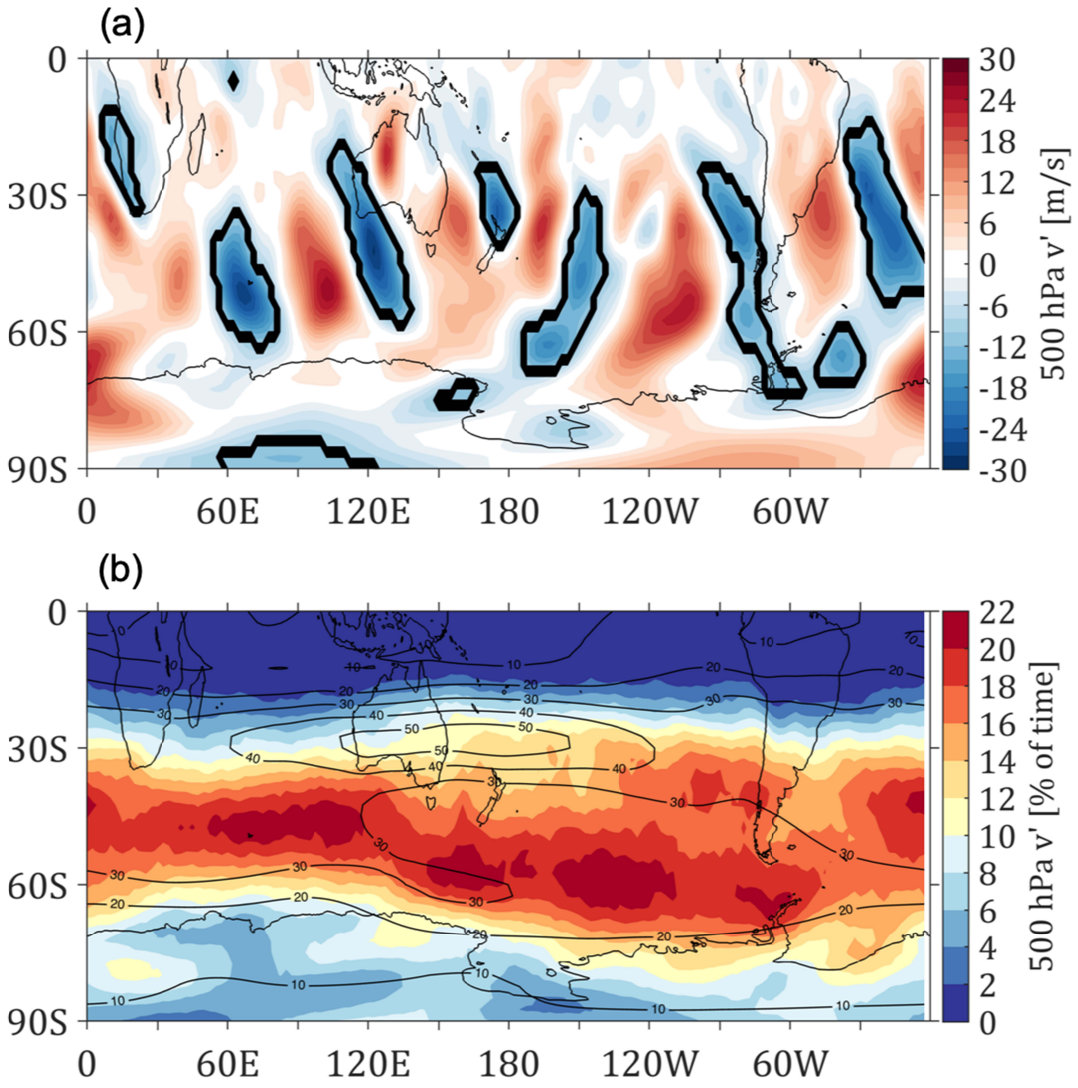


**Figure S5.** Daily meridional wind anomalies at 500 hPa as a proxy for the stormtrack. (a) Anomalies on June 1, 1979 (as an example). The black line highlights the area selected as a disturbance in the mid-troposphere. (b) Climatology 1981-2010 of frequency of disturbances based on v at 500 hPa (in % of time) and wind magnitude at 200 hPa in contours (in m/s).

| Var. | CS Zone | | | S Zone | | |
|---|---|---|---|---|---|---|
| | Clim. | EN | LN | Clim. | EN | LN |
| % of time | 12.3 +/- 4.7 | 13.8 +/- 5.5 | 9.1 +/- 4.6 | 13.3 +/- 4.6 | 13.7 +/- 5.0 | 10.7 +/- 5.2 |
| # | 10 +/- 3 | 10 +/- 3 | 7 +/- 3 | 12 +/- 3 | 11 +/- 3 | 10 +/- 3 |
| days | 2.2 +/- 0.5 | 2.5 +/- 0.4 | 2.0 +/- 0.6 | 2.0 +/- 0.5 | 2.1 +/- 0.8 | 1.9 +/- 0.5 |
| days | 20.7 +/- 7.1 | 24.0 +/- 9.1 | **15.1** +/- 6.6 | 23.0 +/- 6.9 | 23.2 +/- 7.0 | **18.9** +/- 7.5 |
| mm/day | 18.3 +/- 4.1 | 19.2 +/- 5.8 | 17.8 +/- 4.5 | 17.6 +/- 3.5 | 17.8 +/- 3.1 | 17.5 +/- 4.6 |
| days | 18.5 +/- 6.5 | 21.0 +/- 9.0 | **13.6** +/- 6.0 | 21.7 +/- 6.6 | 22.4 +/- 6.5 | **17.6** +/- 7.2 |
| mm | 380 +/- 170 | 470 +/- 230 | 280 +/- 160 | 410 +/- 150 | 430 +/- 170 | 340 +/- 170 |

**Table S1.** Seasonal (JJA) means and standard deviations for the CS and S zone. In bold, values significantly different from the climatology according to a Monte Carlo experiment. See Table 1 for variables.