

Recursos hídricos en la Región de Ñuble

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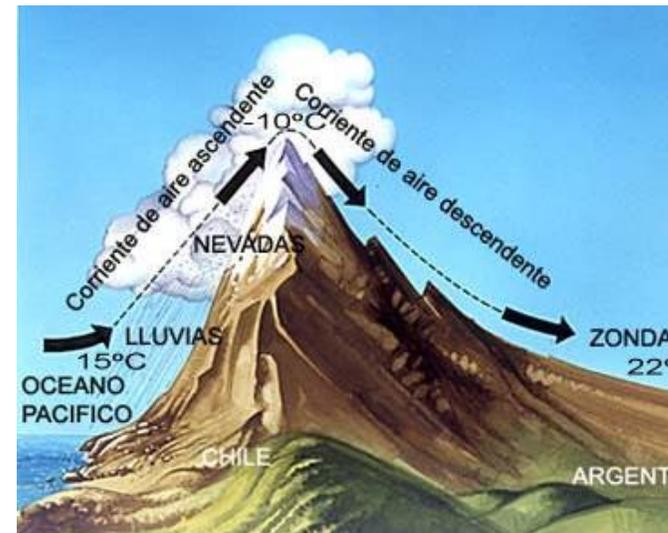
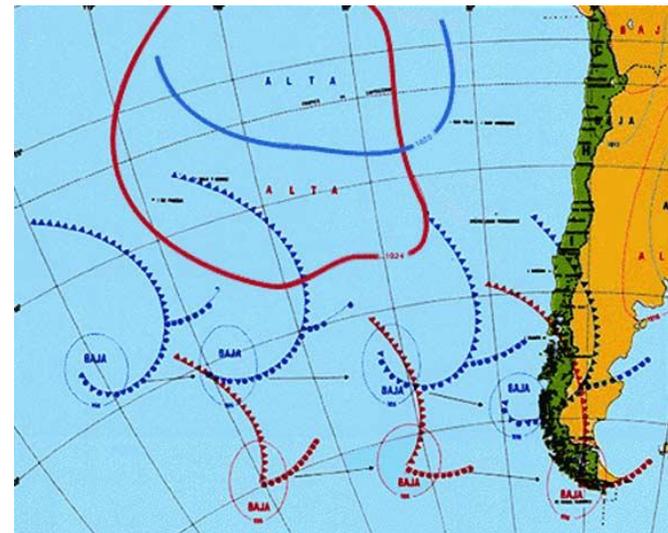
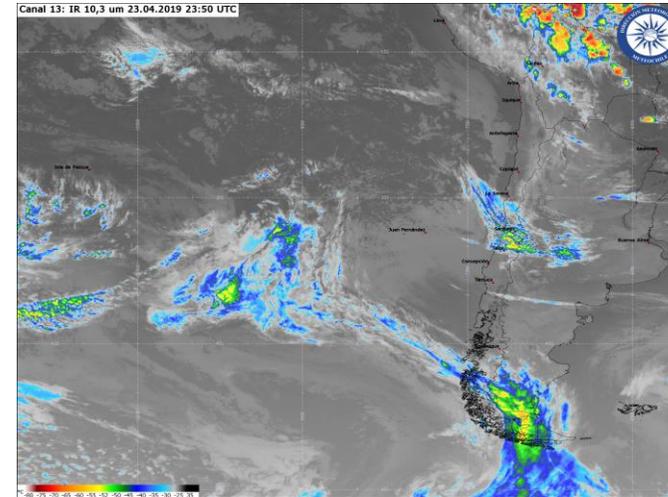
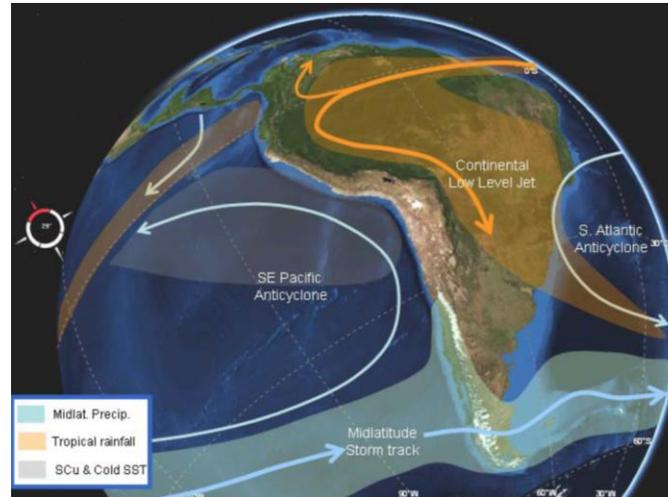
F. de la Hoz – M. Lillo – E. Holzapfel – C. Correa

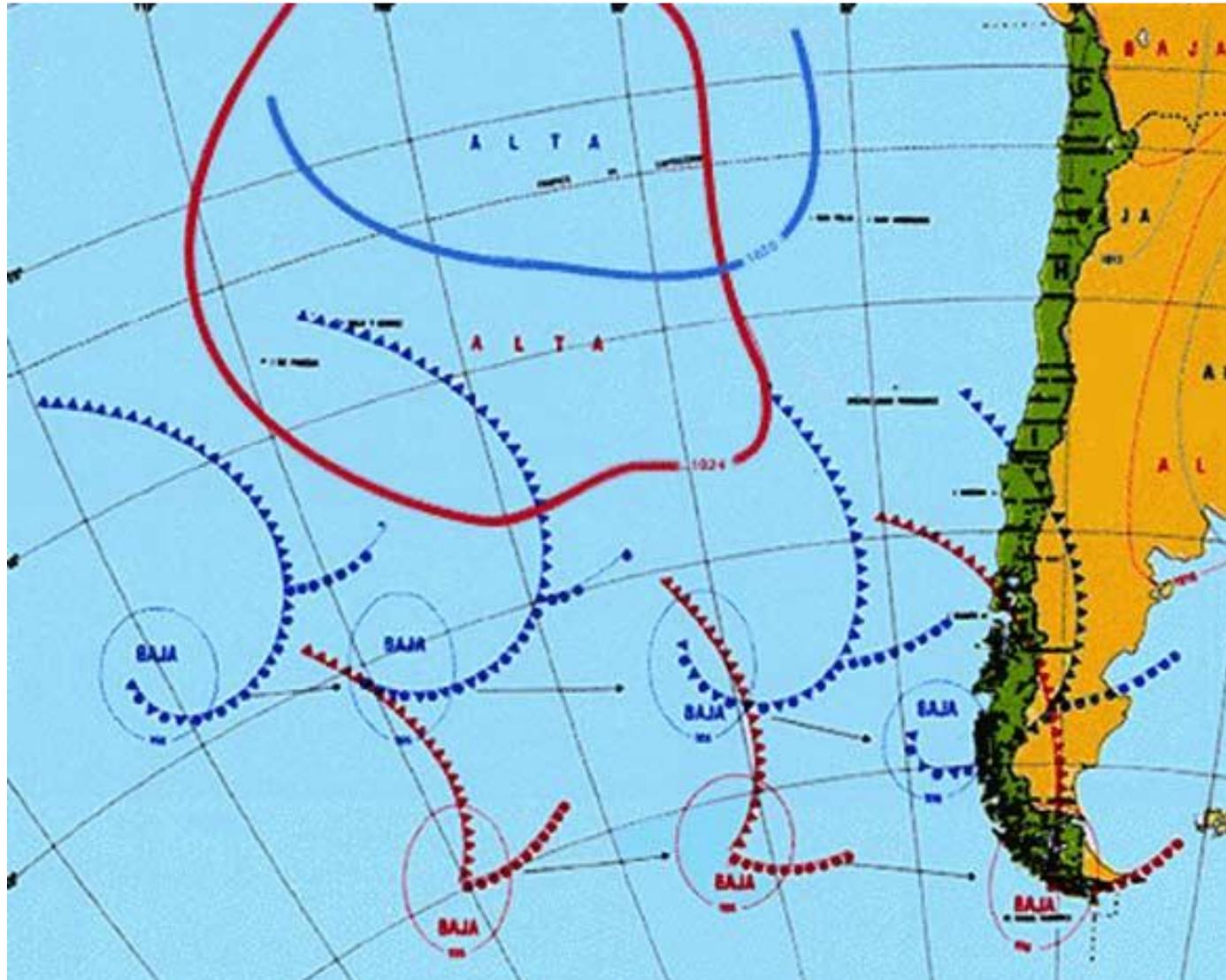
A. Godoy – Faúndez – M. Kuschel – W. Valdivia

TABLA DE CONTENIDOS

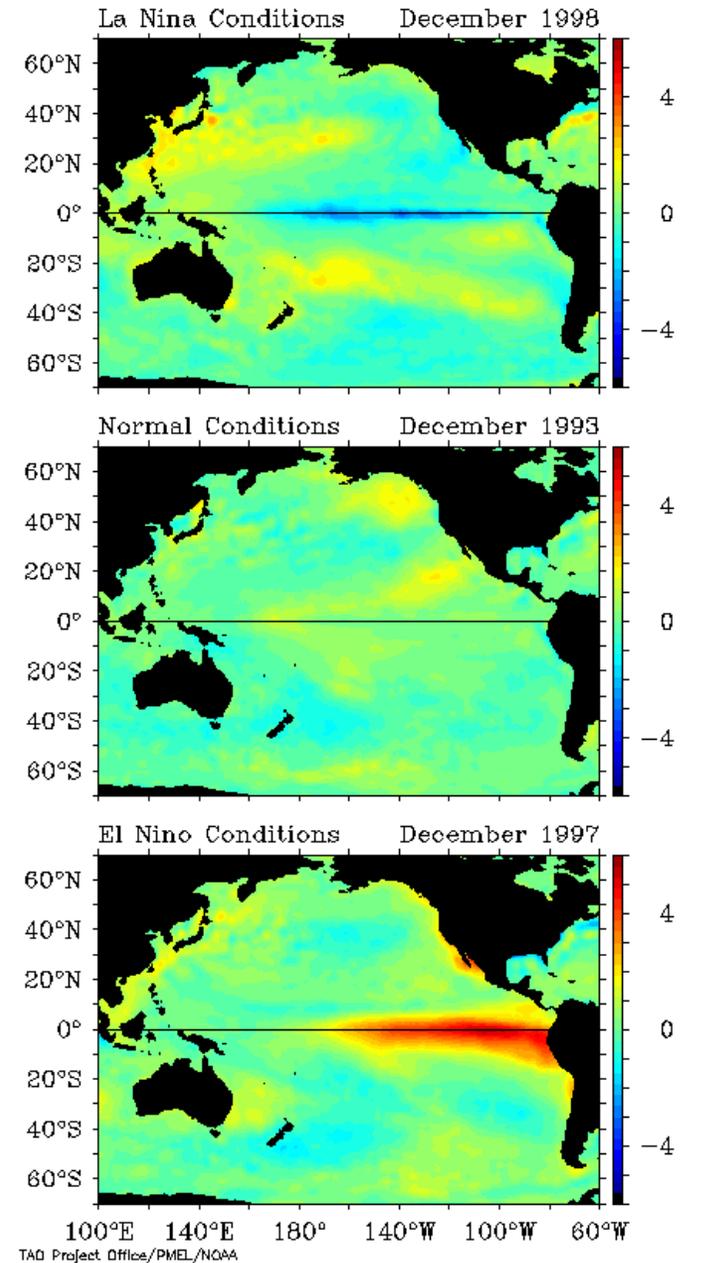
- I. Contexto hidro - climático.**
- II. Tendencias en precipitación y caudal.**
- III. Proyecciones.**
- IV. Comentarios finales.**

I. Contexto hidro - climático

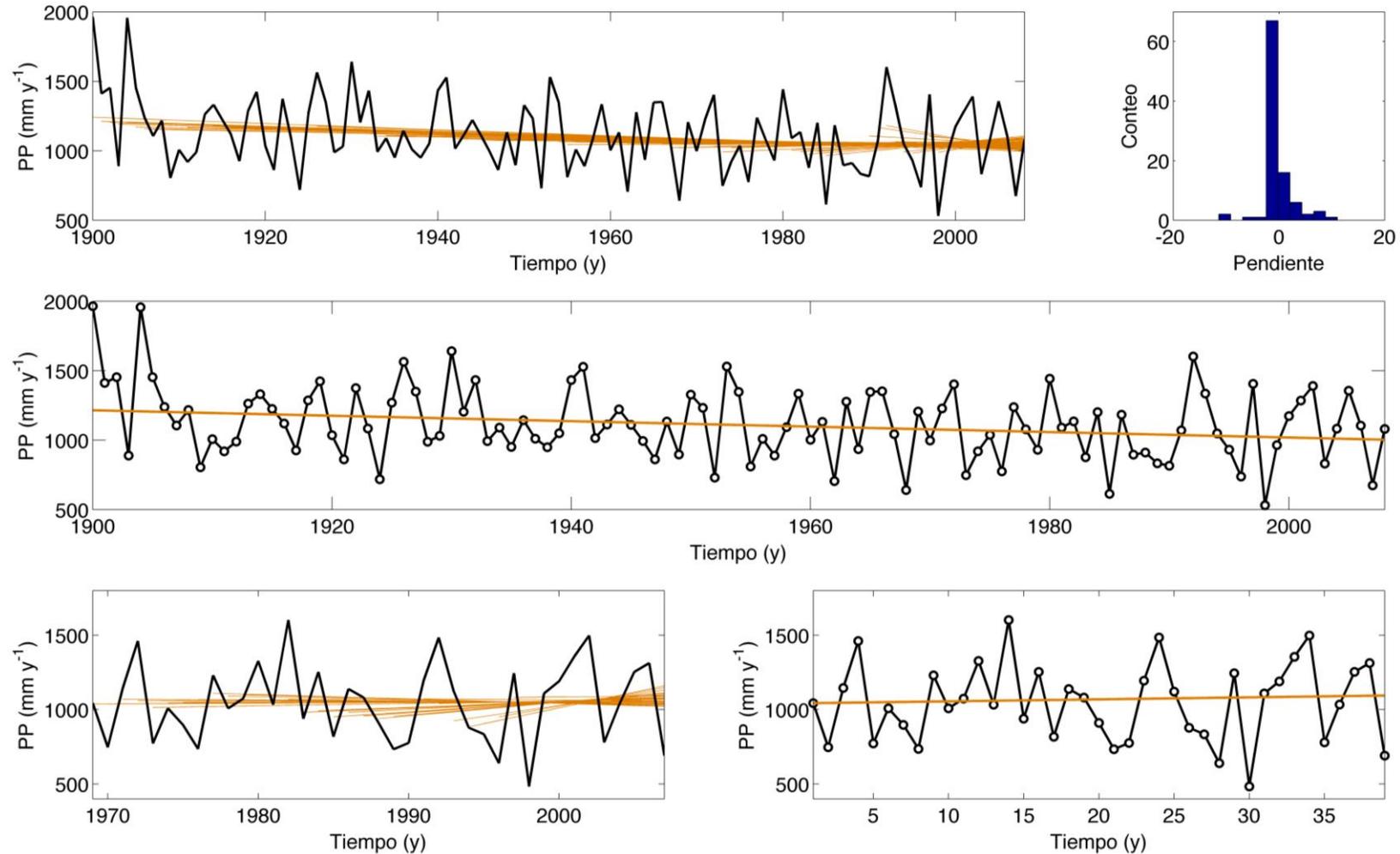


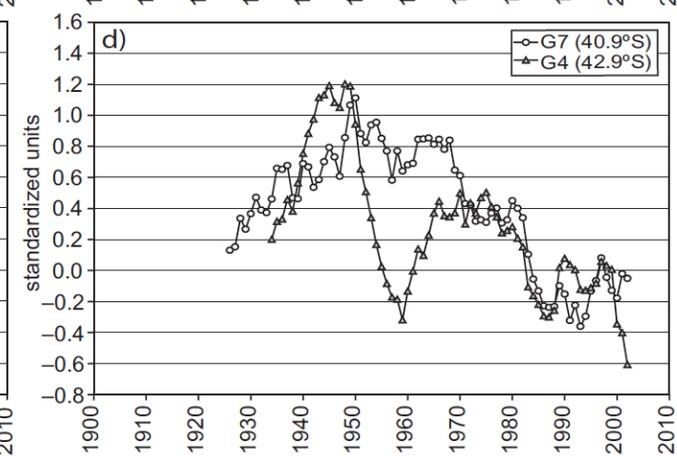
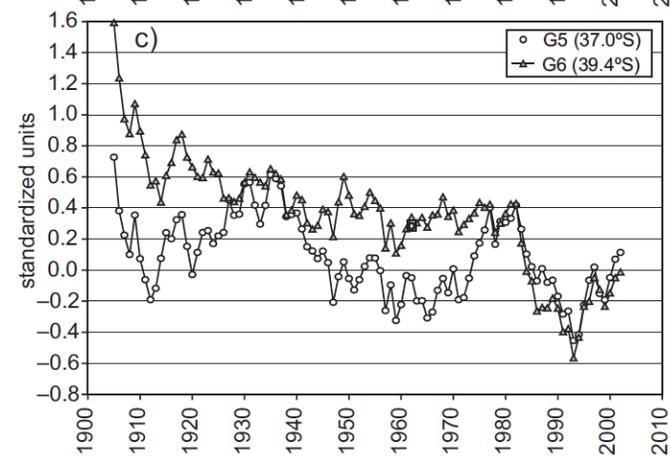
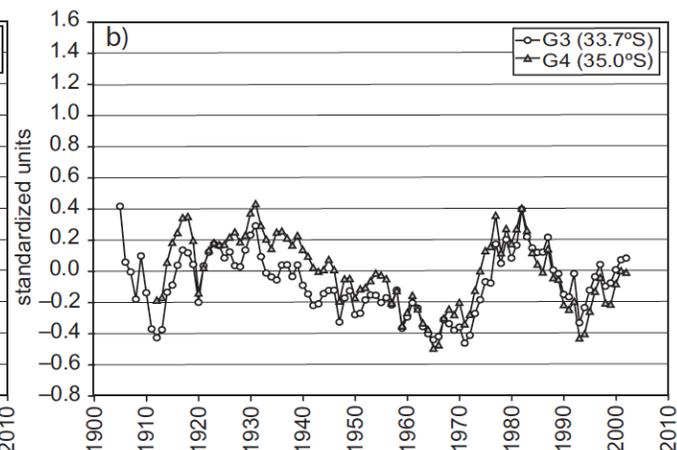
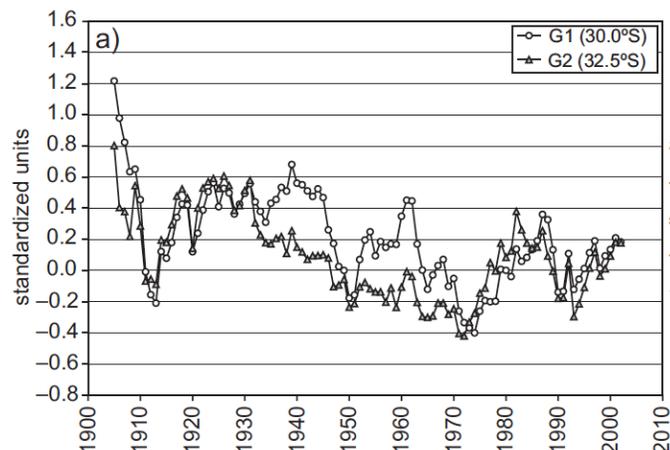
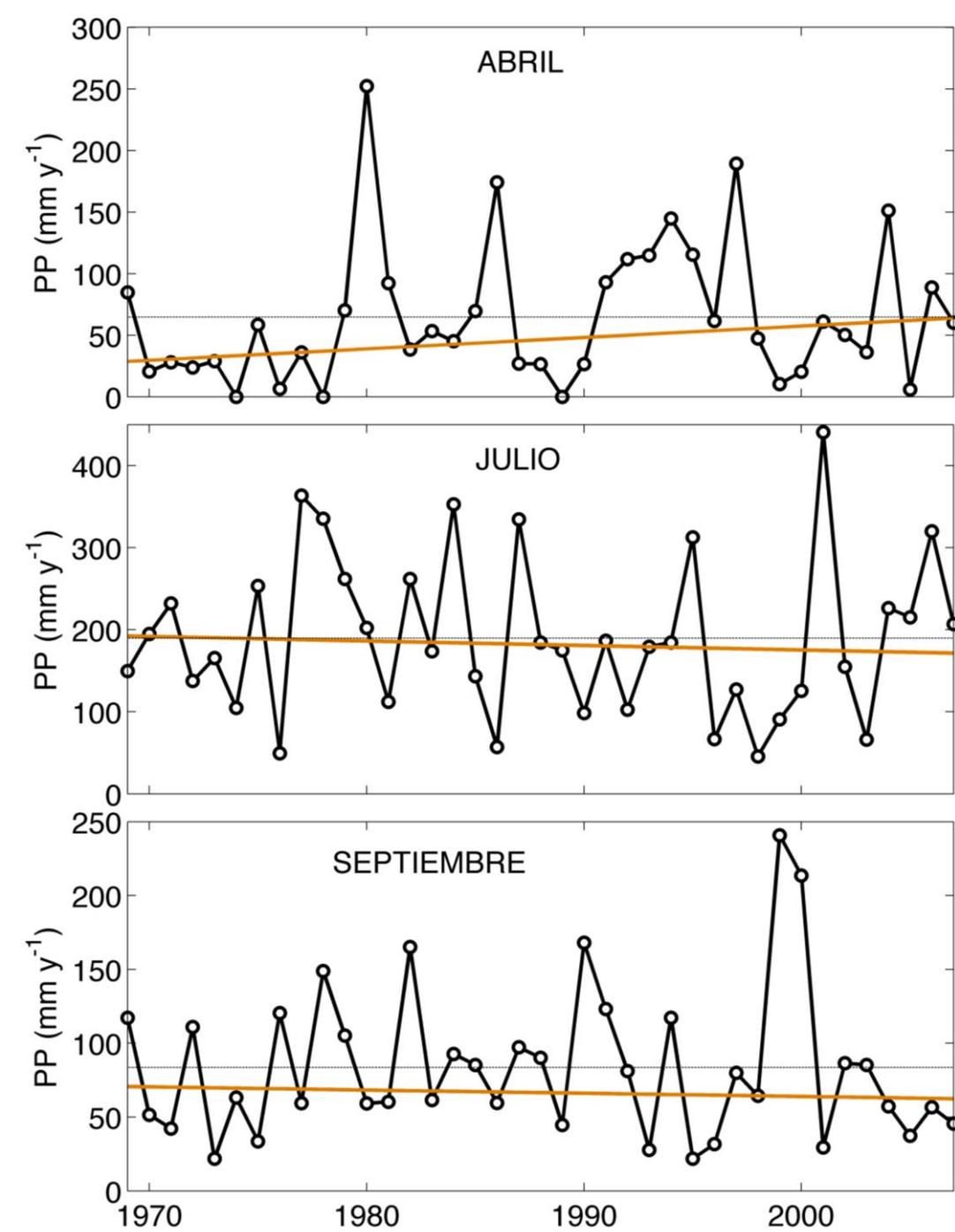


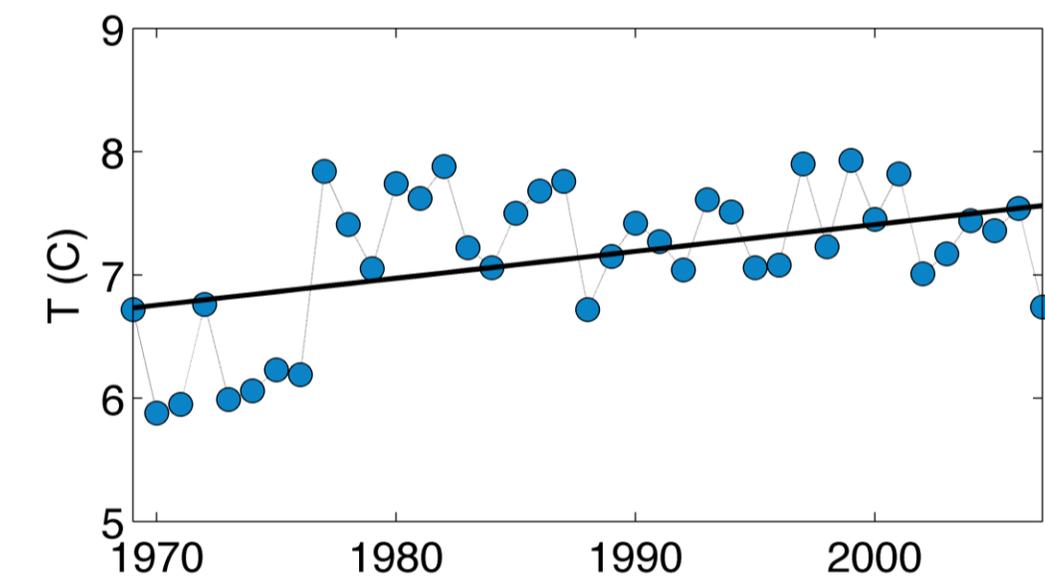
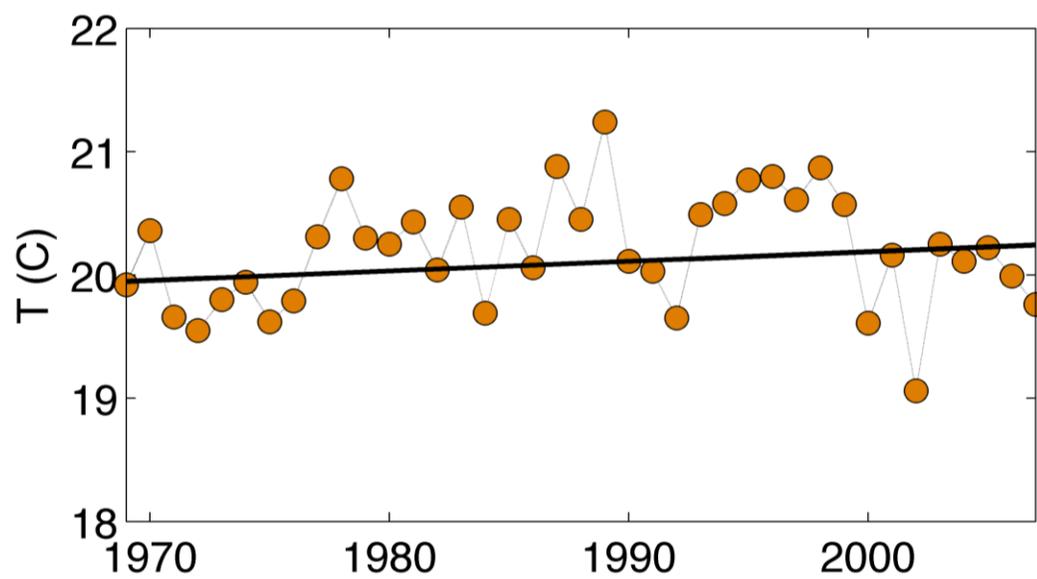
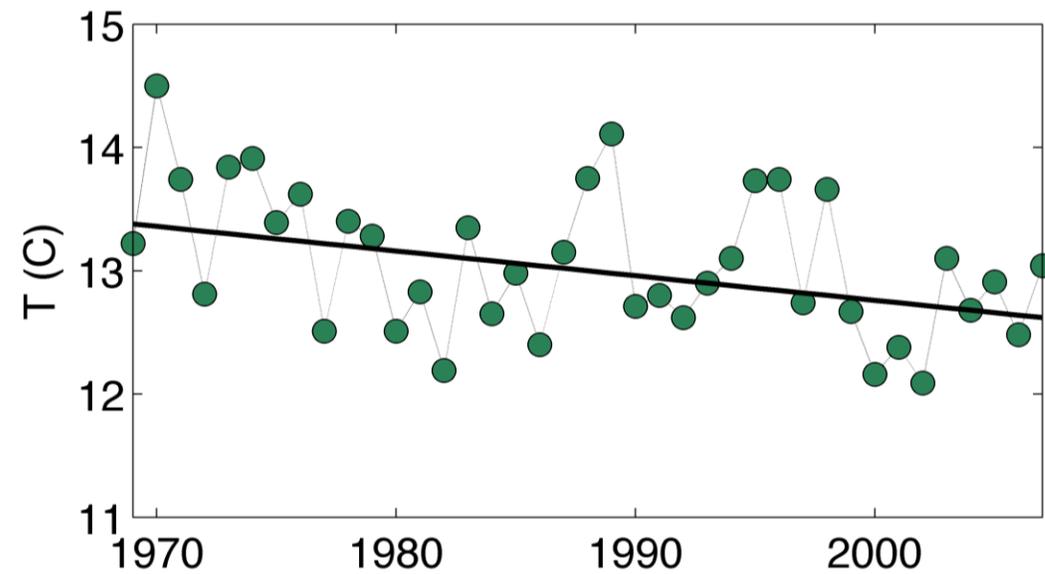
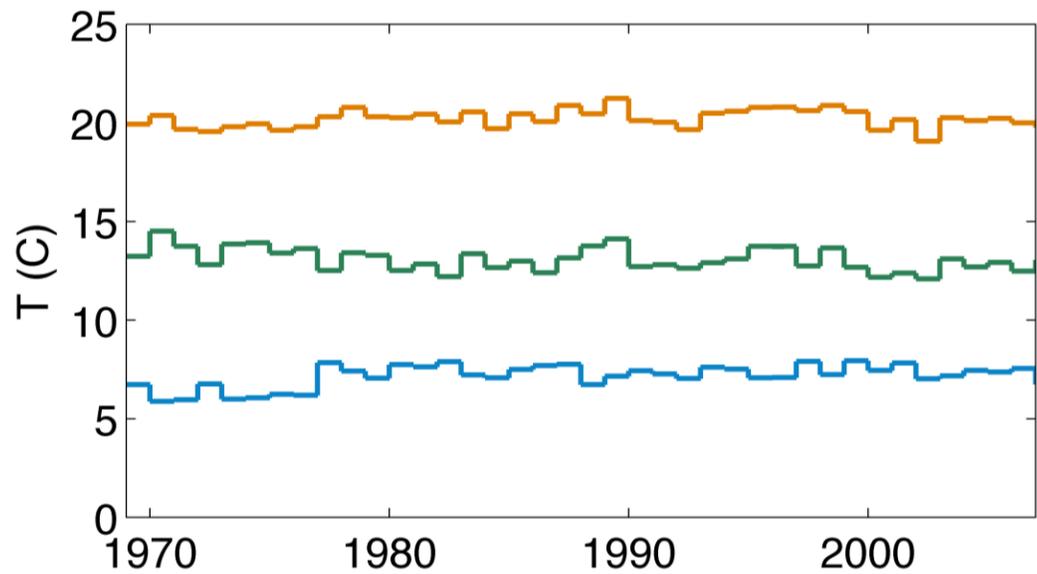
Reynolds Monthly SST Anomalies (°C)



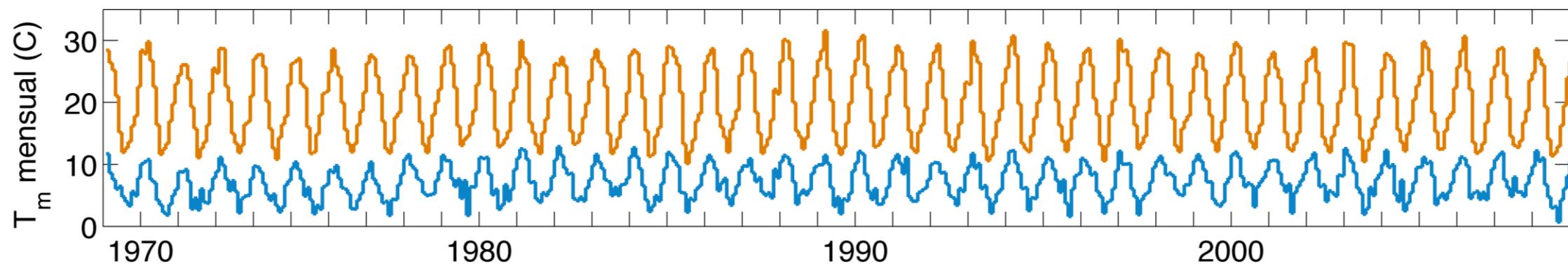
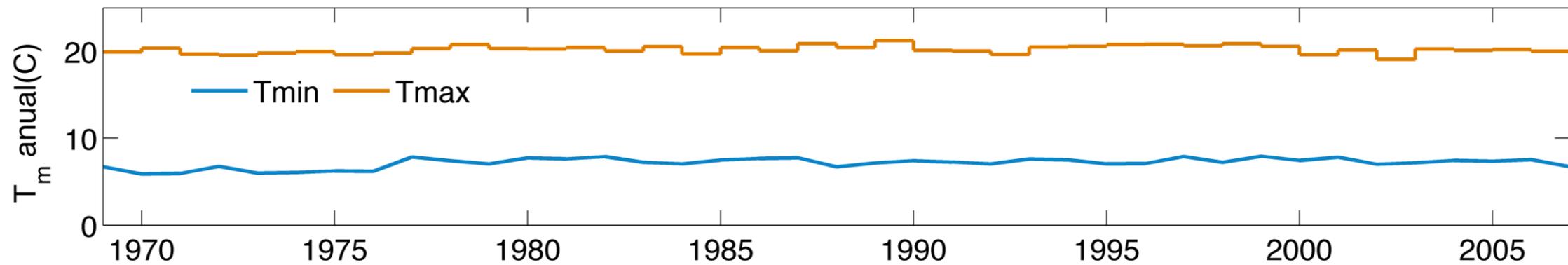
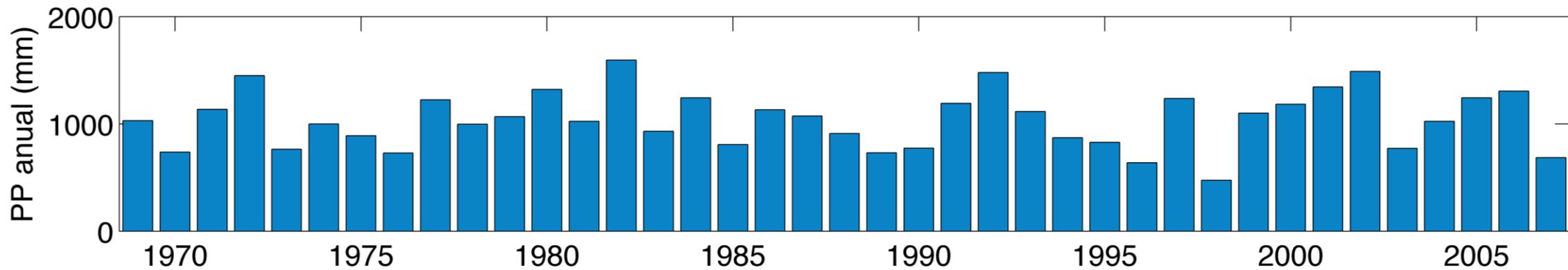
II. Tendencias en precipitación y caudal

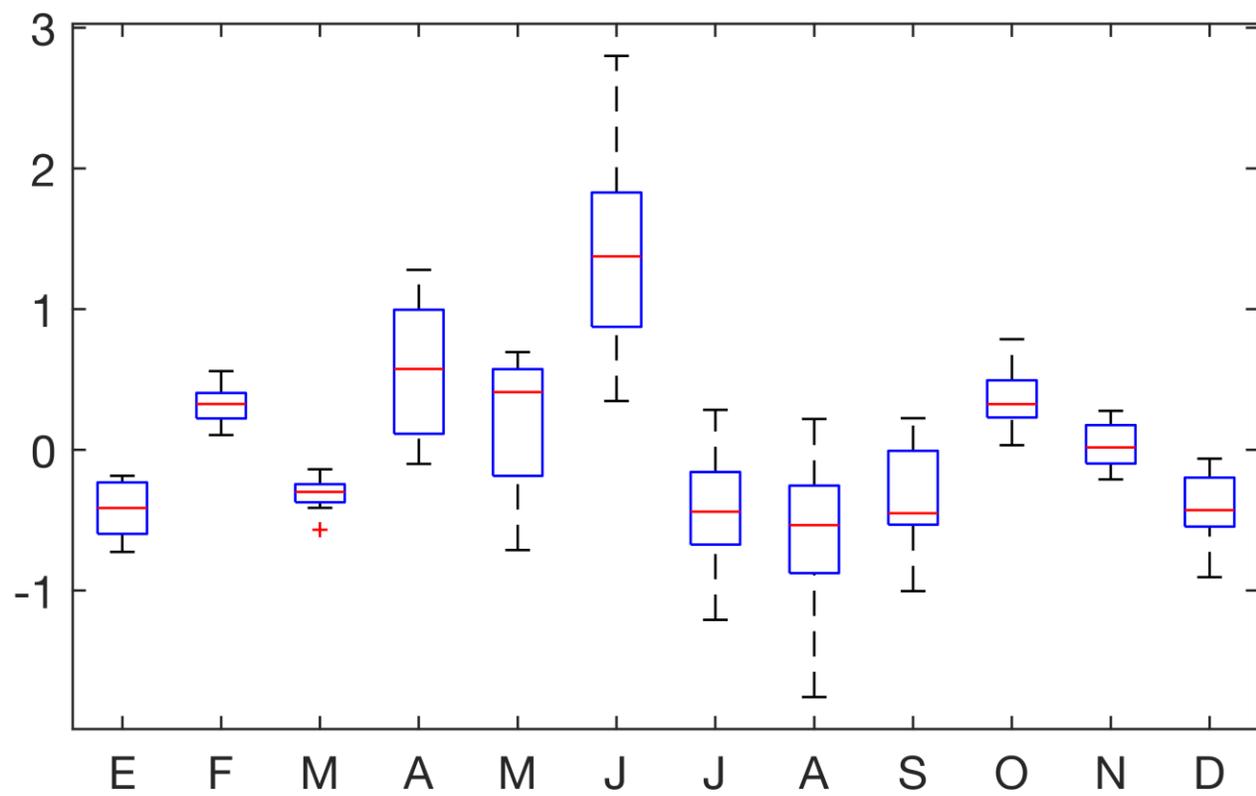
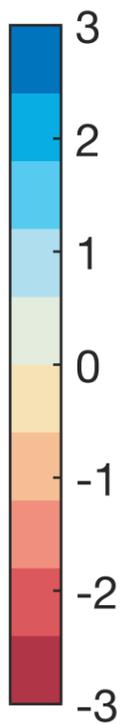
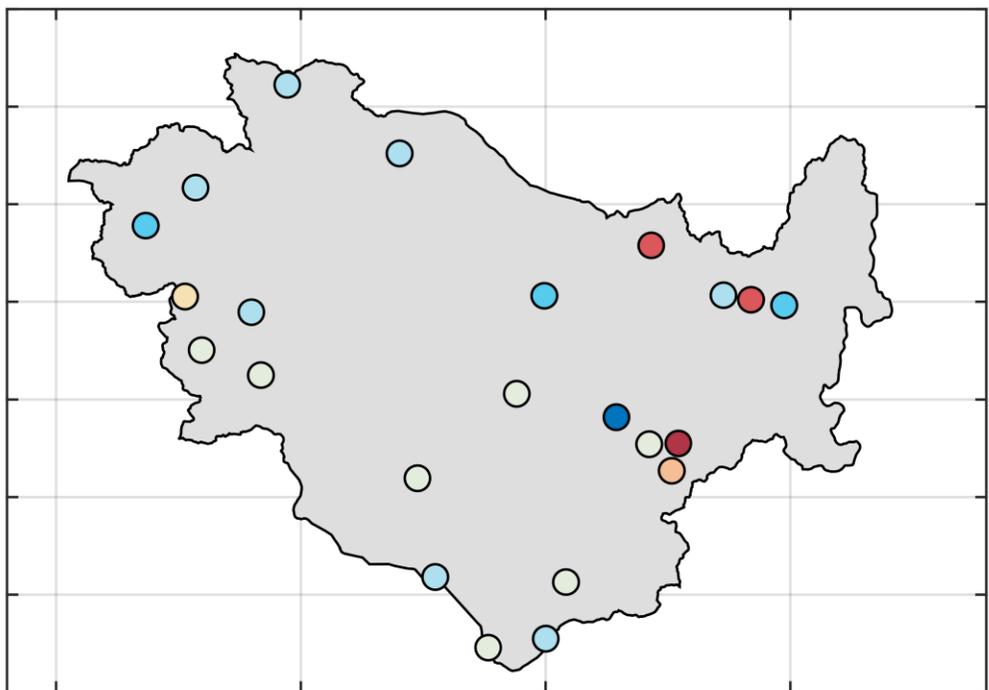


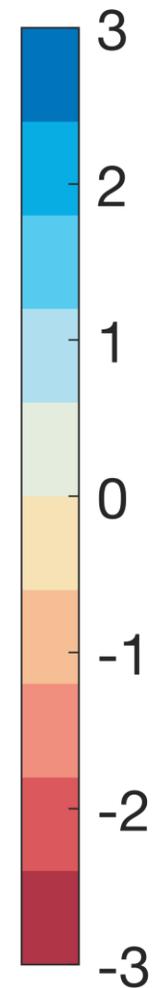
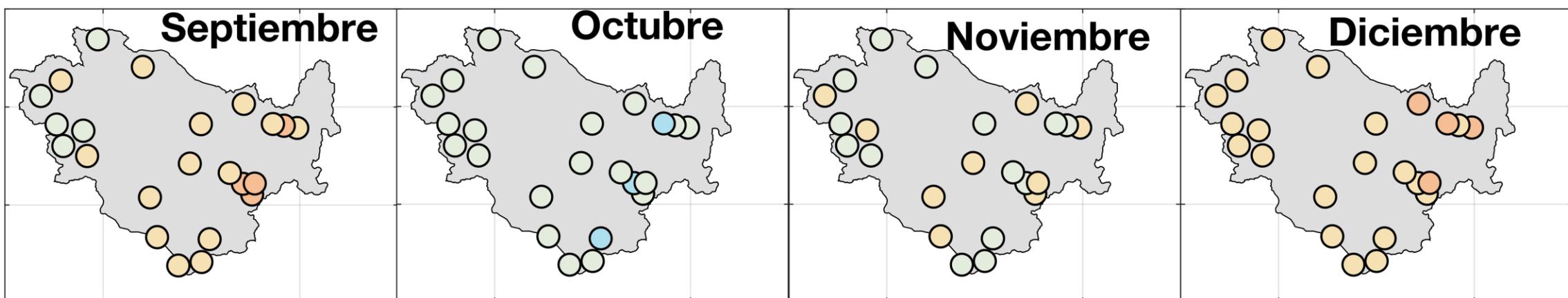
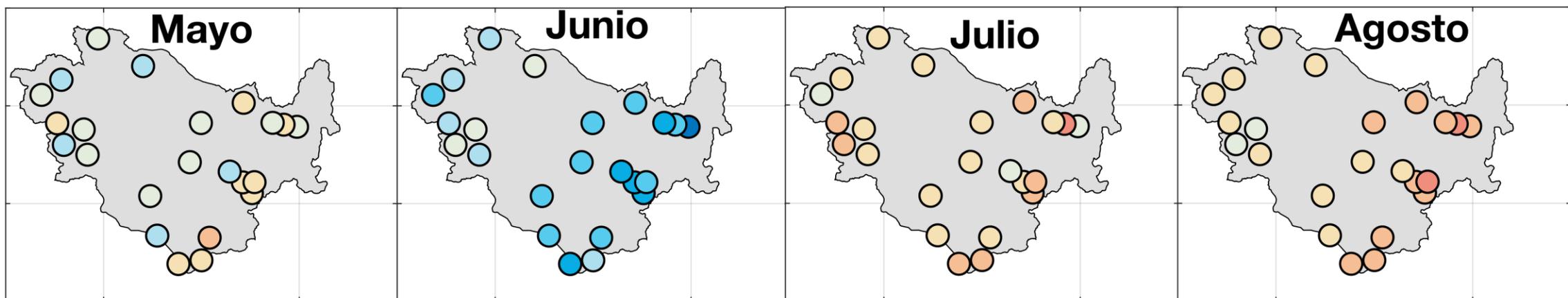
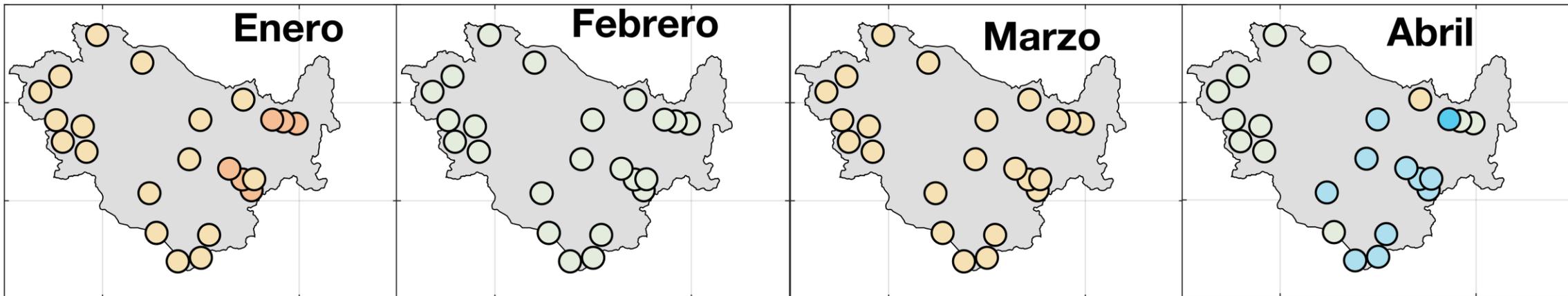




— MK test — T_m MAX — T_m MIN — ΔT







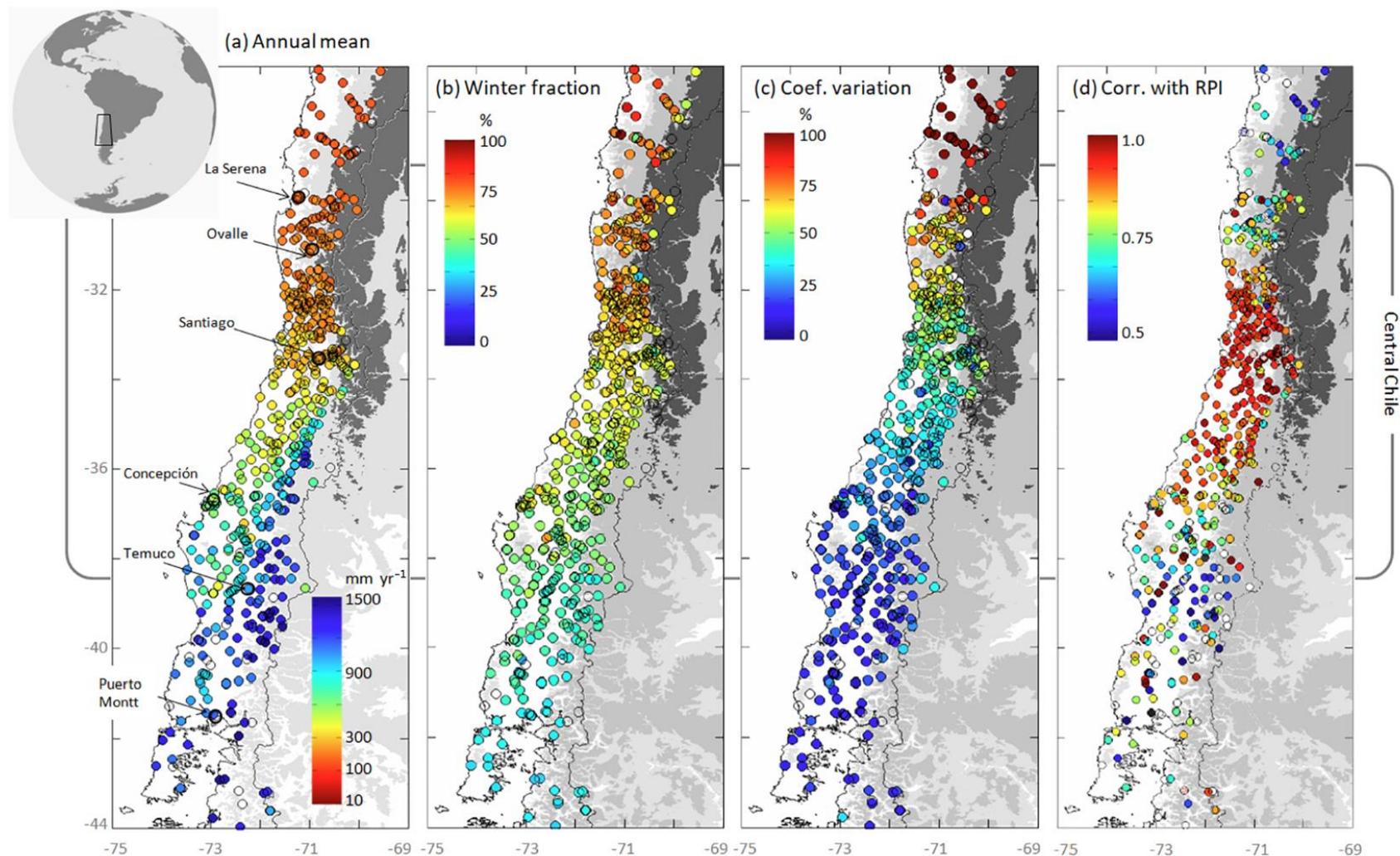


Figure 1. Long-term mean precipitation features along central Chile. **(a)** Annual mean accumulation, **(b)** winter (MJJAS) fraction of the annual total, **(c)** coefficient of variation (interannual standard deviation divided by the long-term annual mean, in %) and **(d)** correlation with the regional precipitation index (annual time series). The variables are color-coded according to their value in each precipitation station. The solid lines are the coastline and the political border. Grey and black background areas indicate terrain elevation in excess of 1500 and 3000 m a.s.l., respectively. Reference period: 1980–2010.

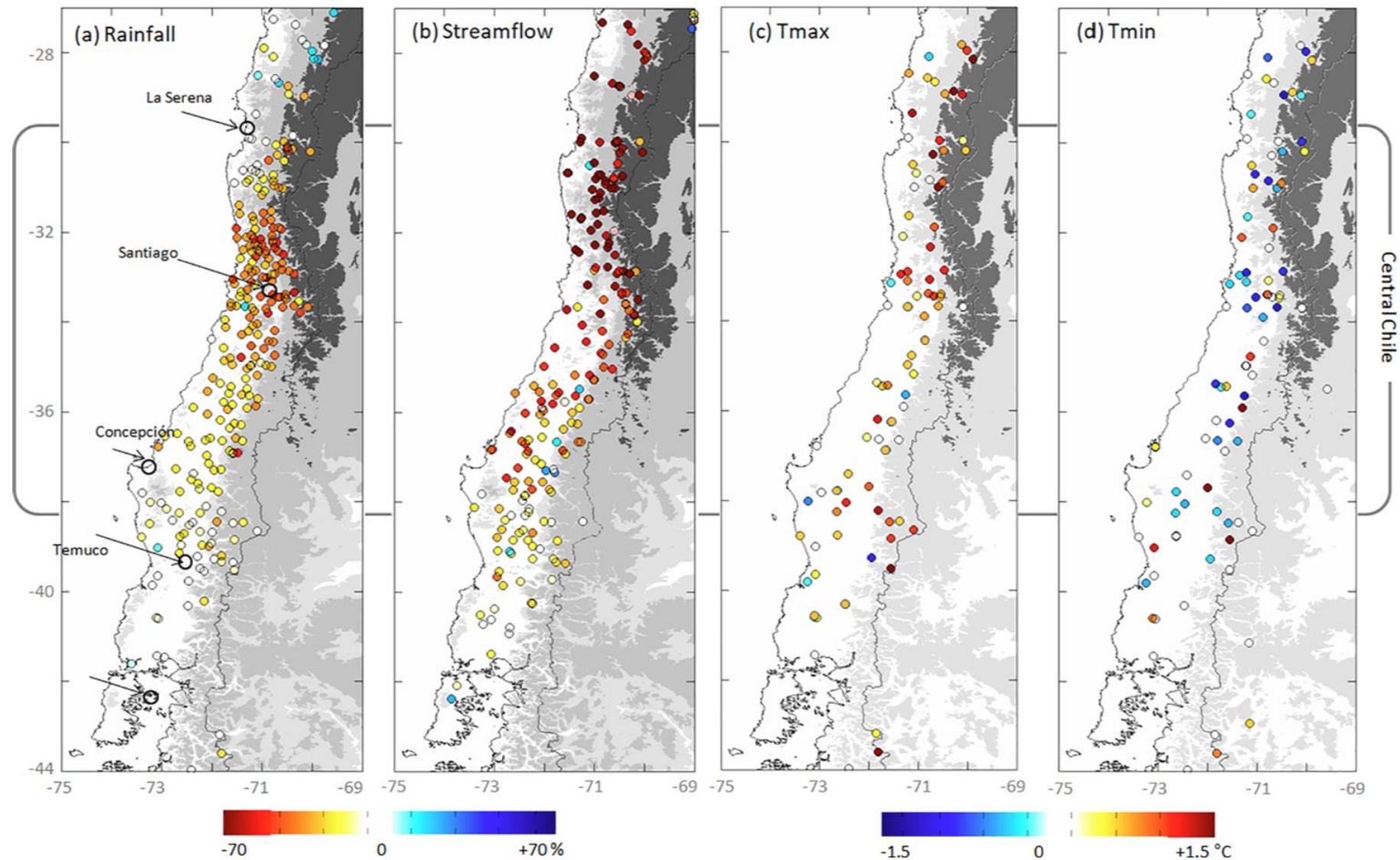


Figure 5. Station-based anomalies during the megadrought: (a) rainfall, (b) riverflow, (c) maximum temperature, and (d) minimum temperature. In all cases we first calculate the annual mean (accumulation for rainfall), then average the 2010–2015 period, and finally subtract the respective long-term mean (LTM; 1980–2010). Rainfall and riverflow MD anomalies expressed as a percentage of the LTM. Temperature anomalies are absolute values in °C. Note the existence of some outliers (e.g., a warming station within a cooling region), probably due to problems in data quality.

III. Proyecciones & pronósticos

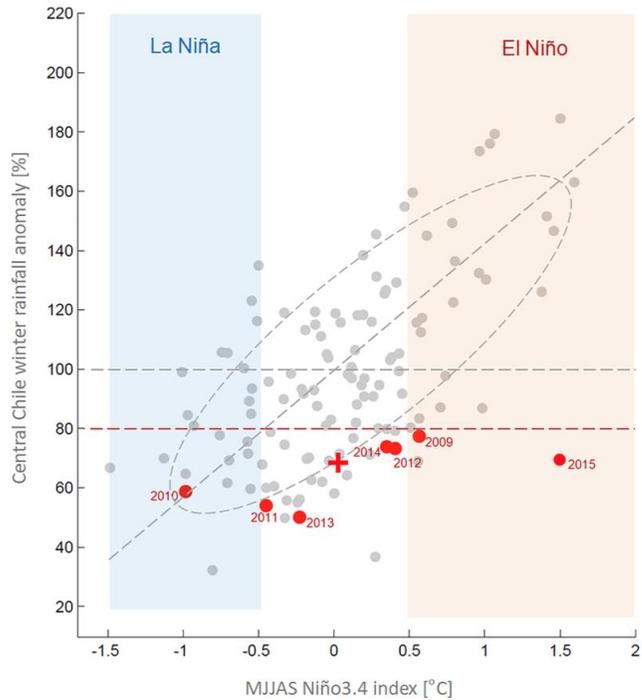
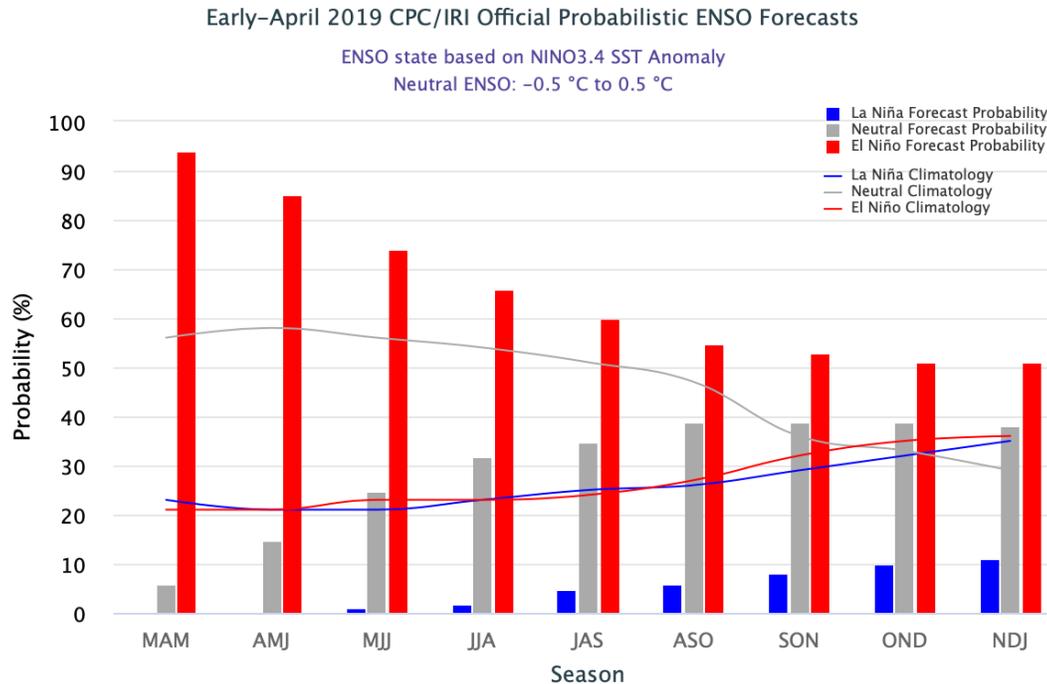
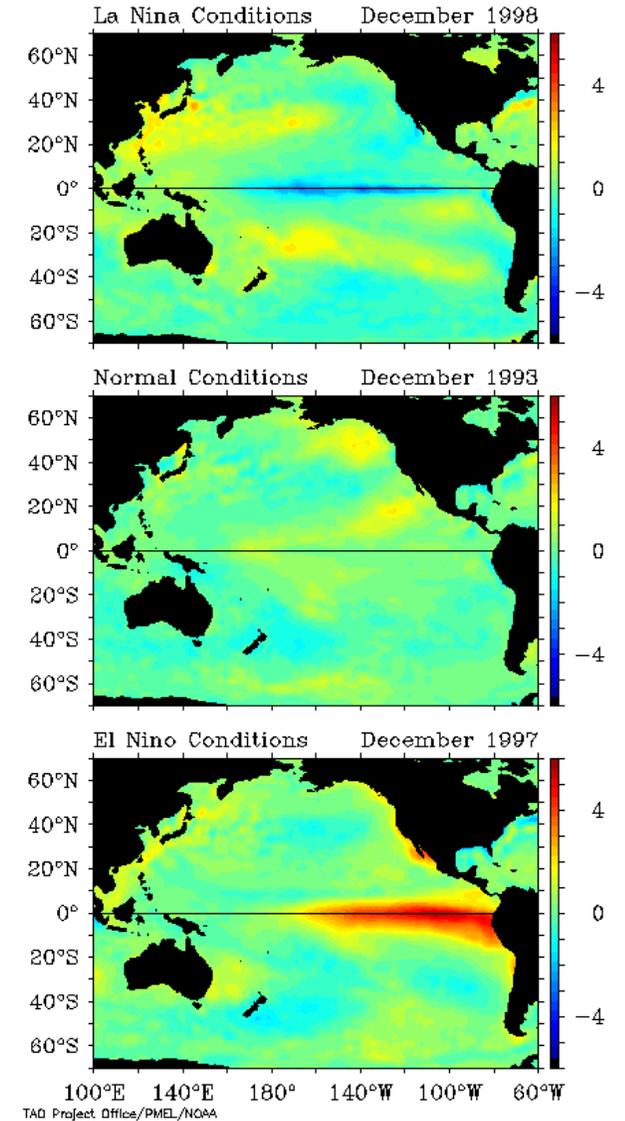


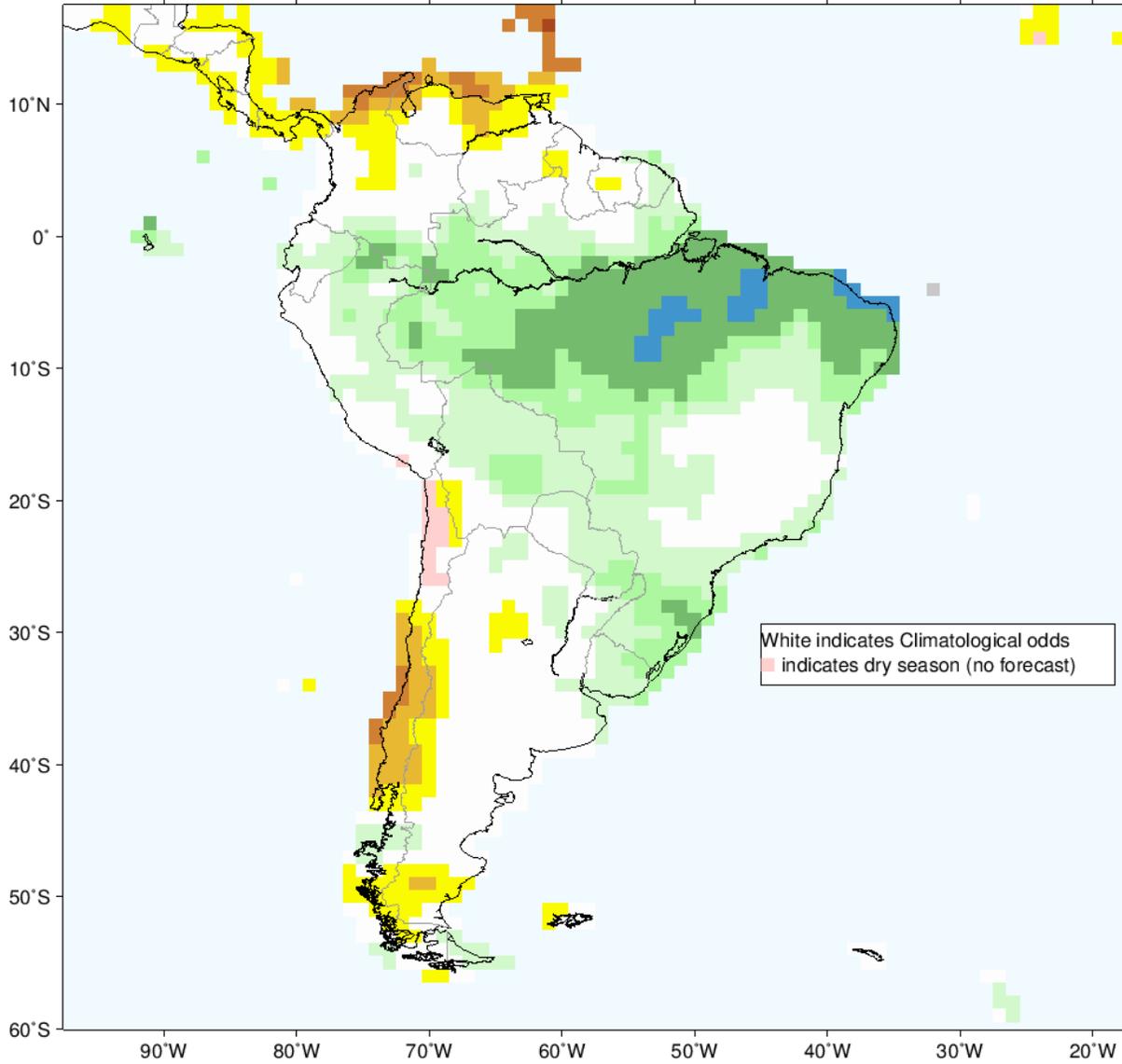
Figure 8. Scatter plot between the winter (MJJAS) average of Niño3.4 and the central Chile precipitation index (RPI). Data from 1915 onwards; the years forming the MD are highlighted in red. The Niño3.4 index is the area-averaged SST anomaly in the region 5° S–5° N and 170–120° W.



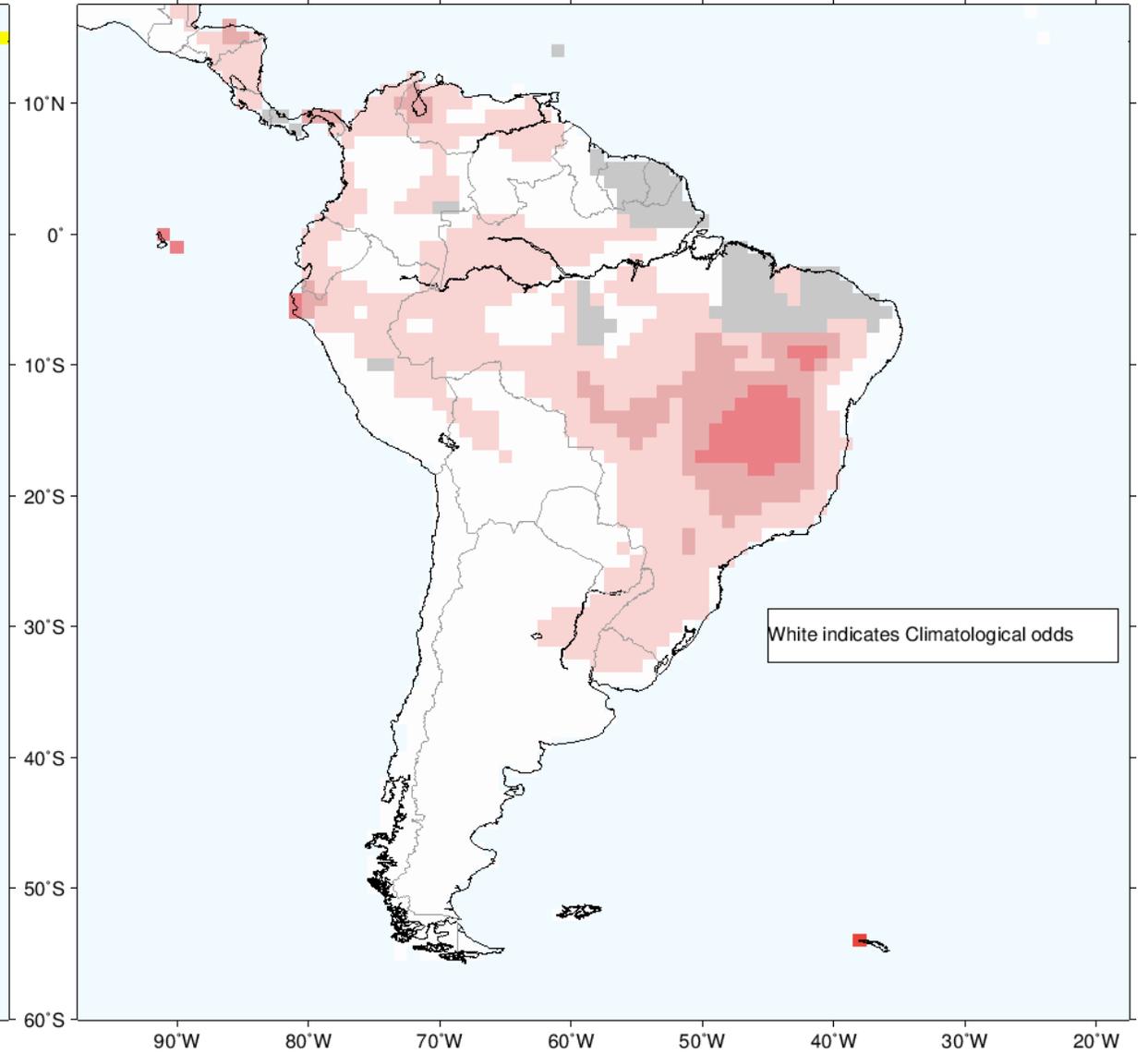
Reynolds Monthly SST Anomalies (°C)

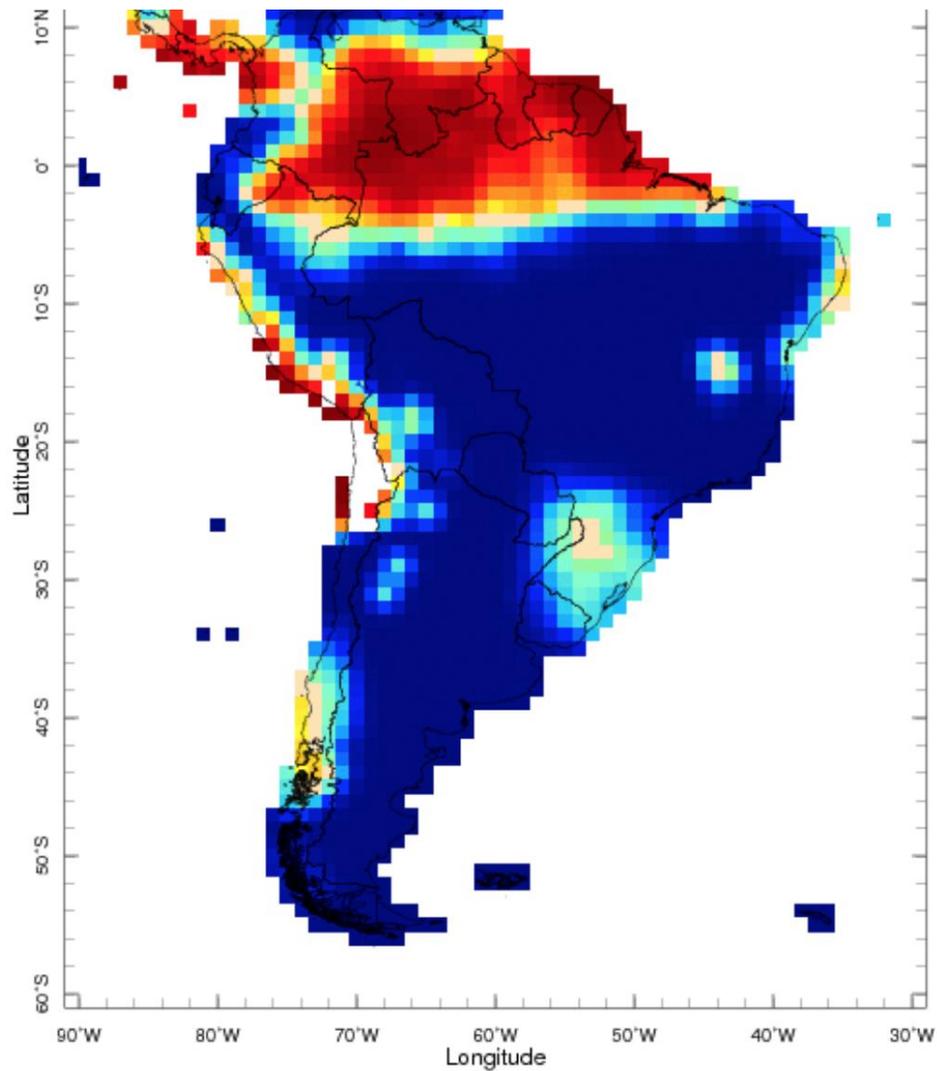


IRI Multi-Model Probability Forecast for Precipitation for
May-June-July 2019, Issued April 2019

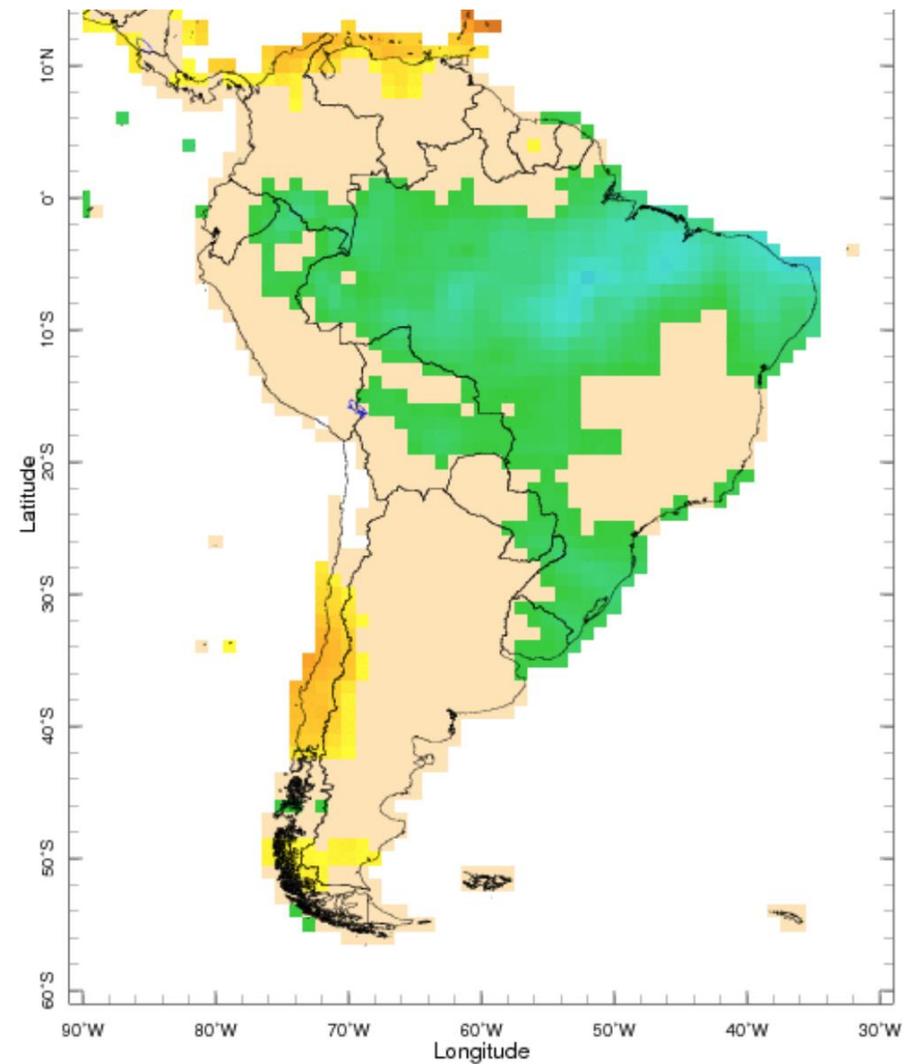


IRI Multi-Model Probability Forecast for Temperature for
May-June-July 2019, Issued April 2019

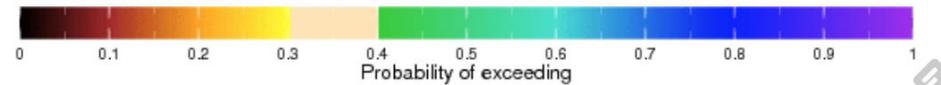




May-Jul 2019 Flexible seasonal Precipitation forecast issued Apr 2019

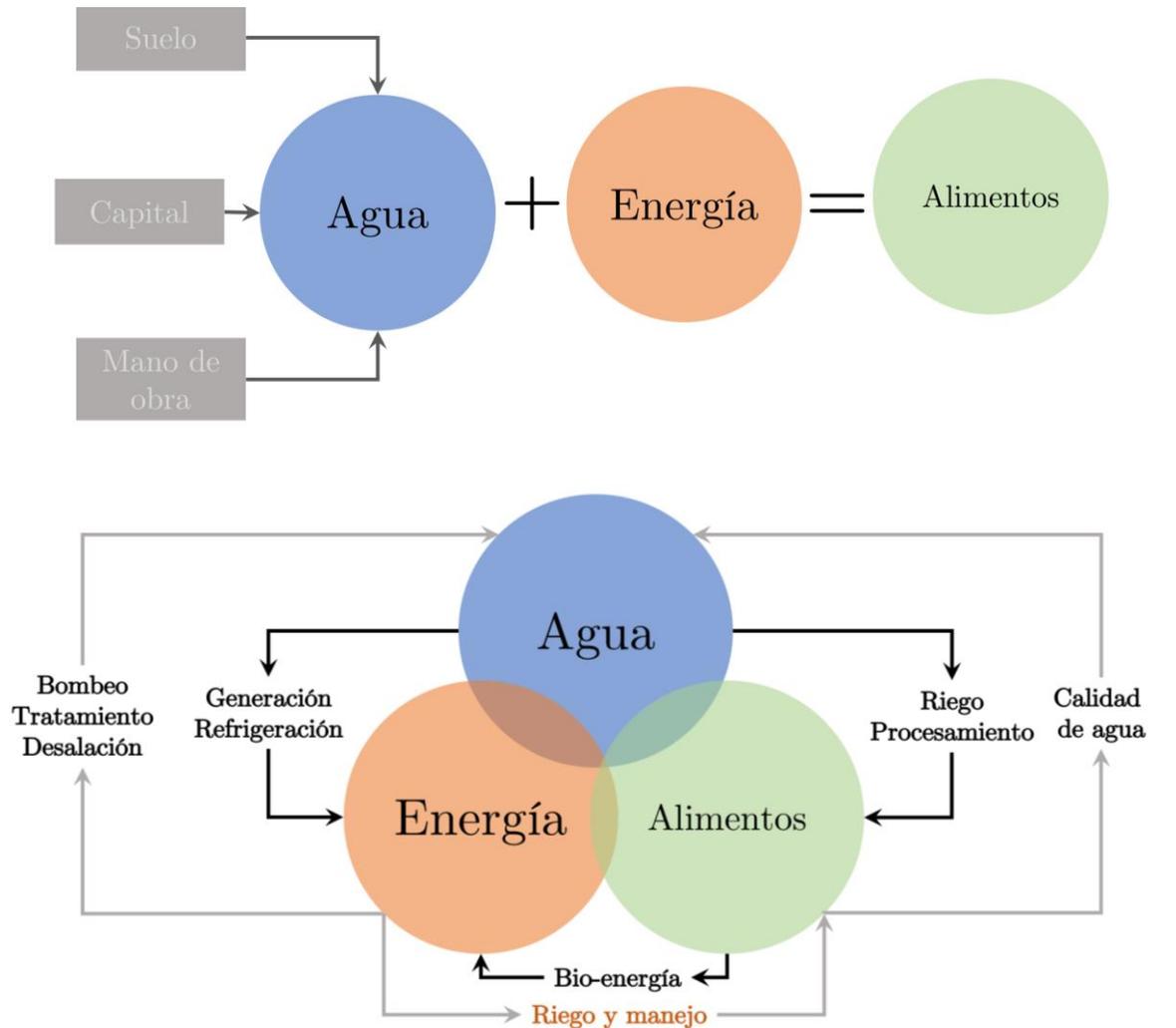


May-Jul 2019 Flexible seasonal Precipitation forecast issued Apr 2019



http://iridl.ideo.columbia.edu/maproom/Global/Forecasts/NMME_Seasonal_Forecasts/precip_full.html?bbox=bb%3A-90%3A-60%3A-30%3A15%3Abb®ion=bb%3A-90%3A-60%3A-30%3A15%3Abb&var=Precipitation&percentile=65.0&threshold2=500

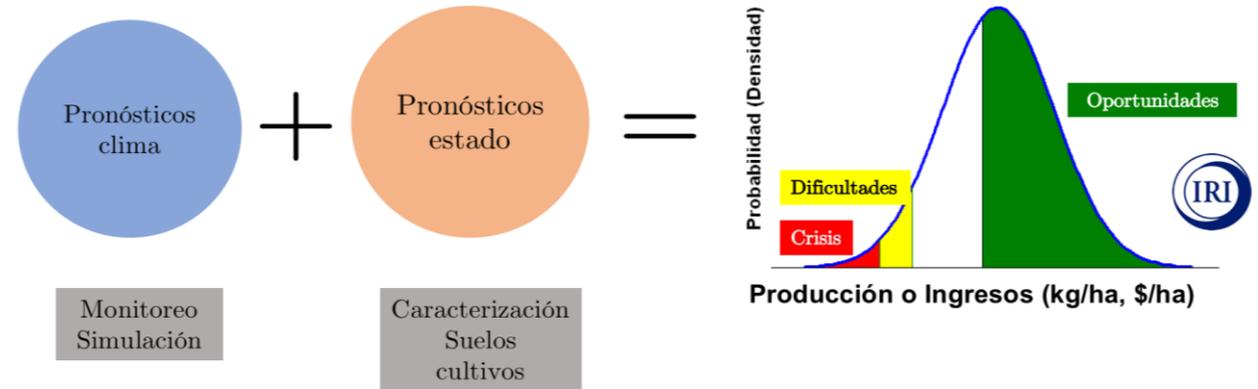
IV. Comentarios finales



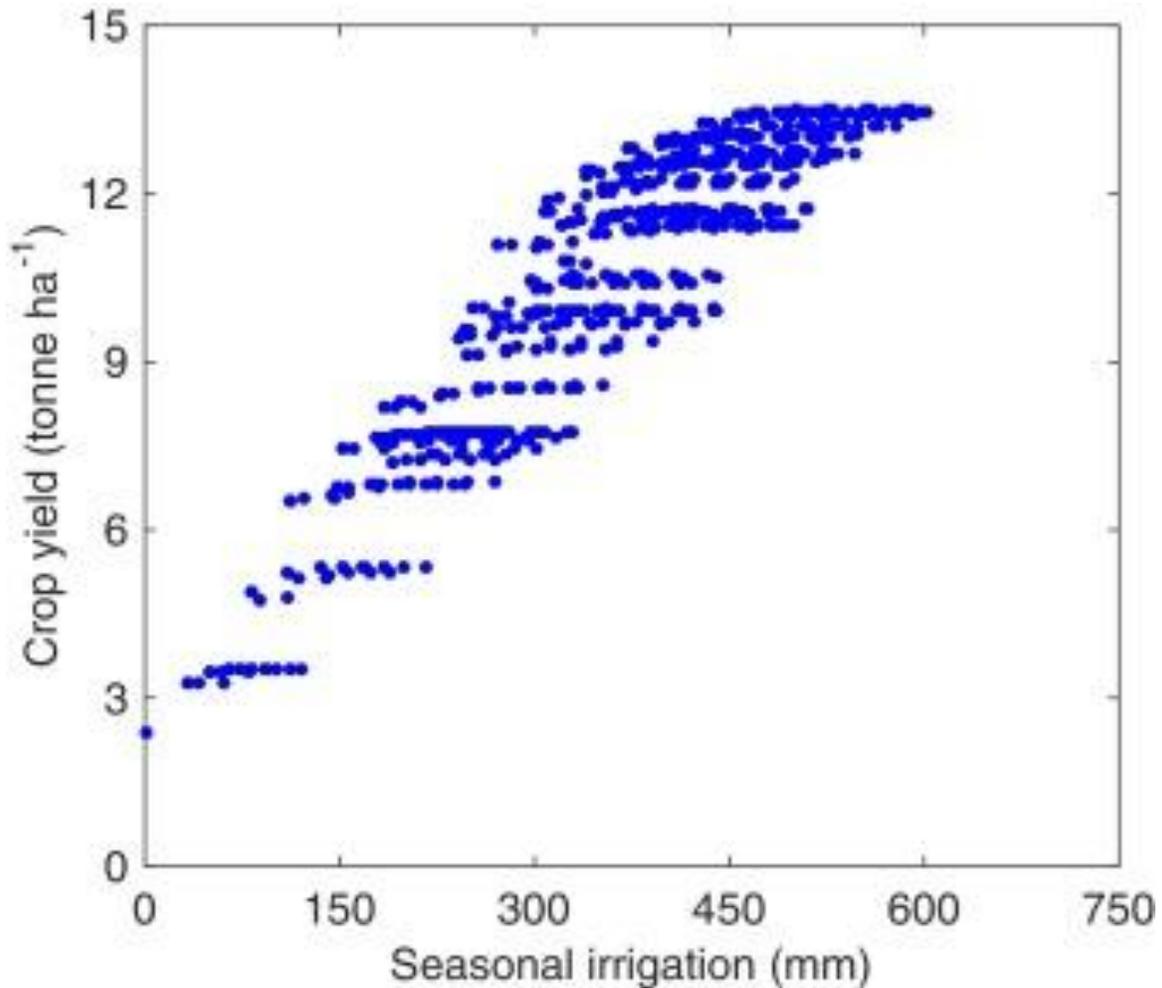
Nexo Agua – Energía – Alimentos

Un paso adelante: integración tecnología y clima

Combinar Información Climática en productos que sean más útiles para la agricultura



Gestión del riesgo requiere de información

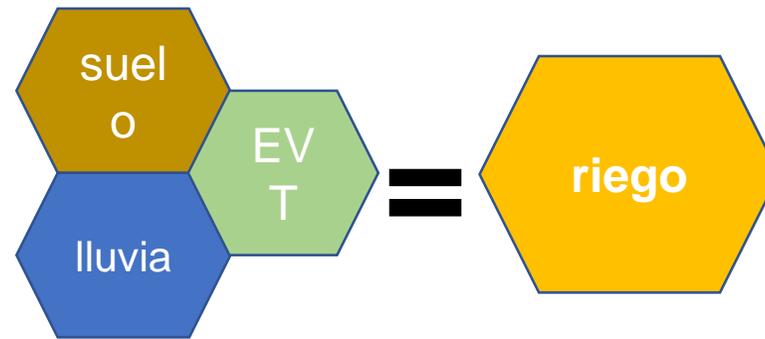


Manejo a nivel predial

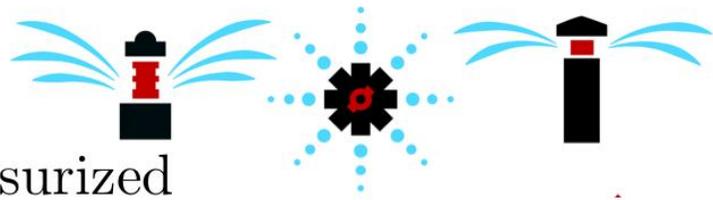
- Diferentes estrategias de riego nos llevan a diferentes producciones → No solo el volumen importa.

¿Cómo maximizamos la producción mientras, al mismo tiempo, minimizamos los impactos?

Balance de agua a diferentes escalas

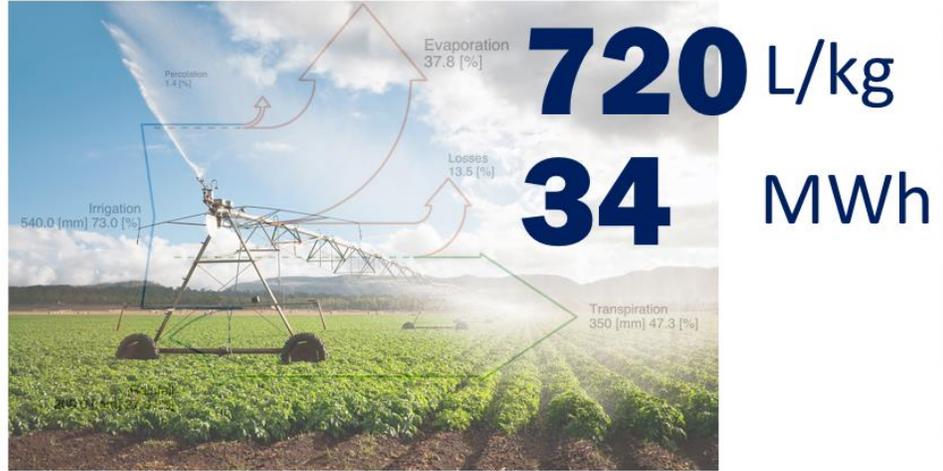


- Pronósticos, monitoreo, *data science*.
- Adaptación y mitigación.
- La importancia del *casetero*, el rol del *asesor de riego*.
- Análisis de ciclo de vida.



Pressurized

90 %
Efficiency

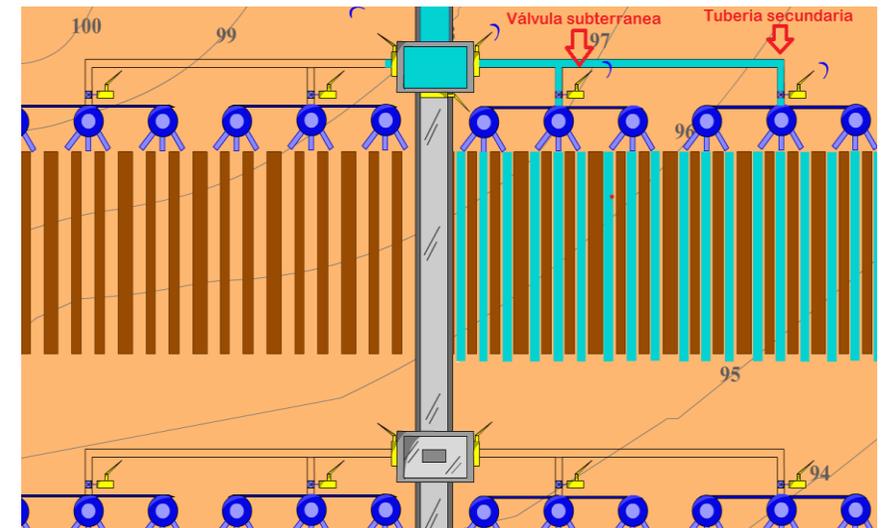
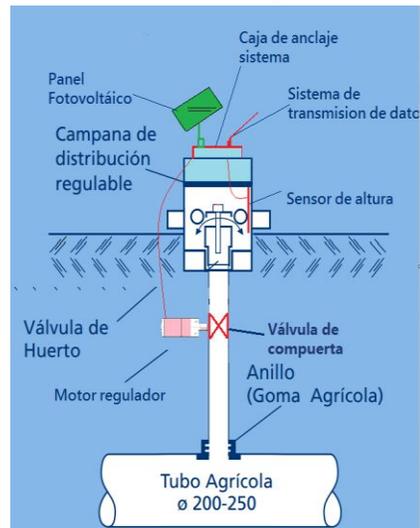
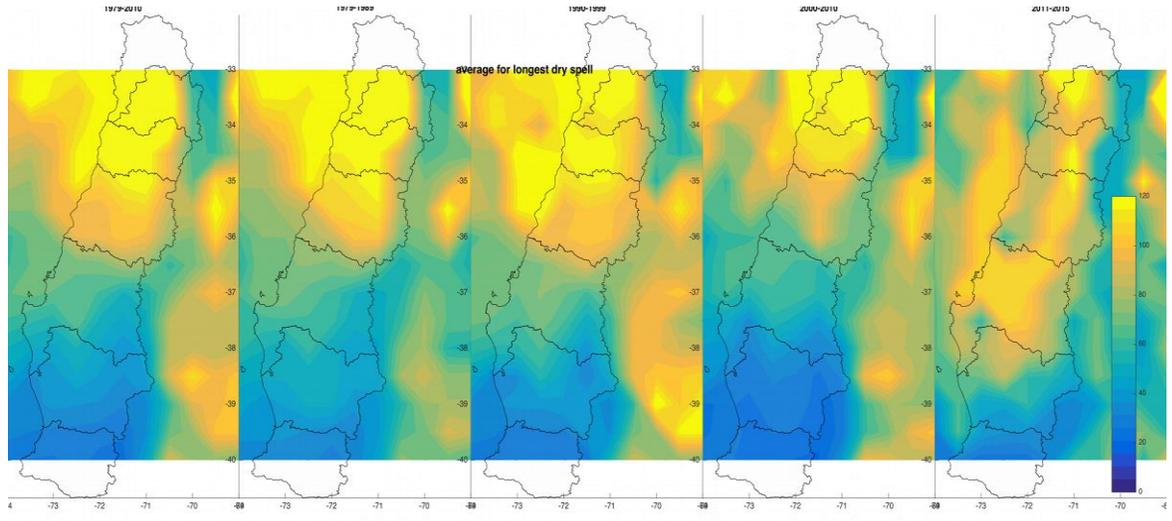
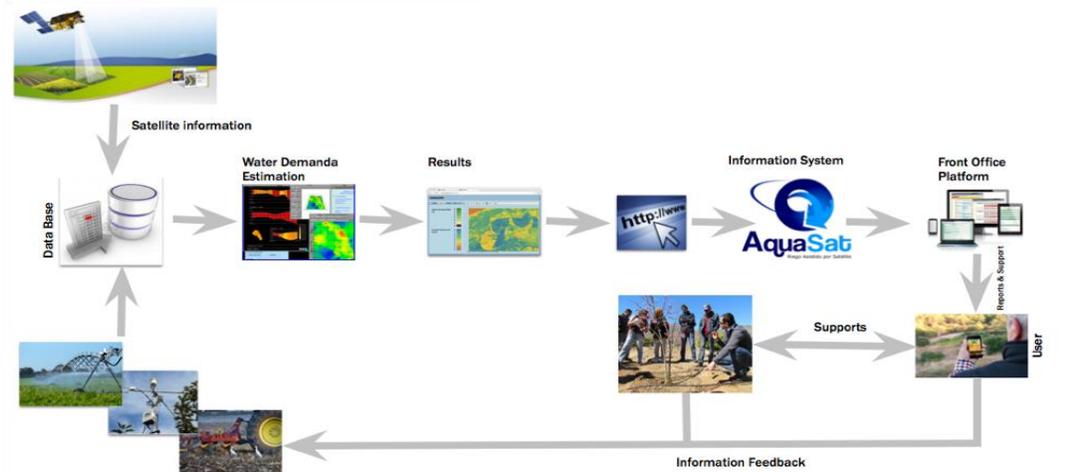
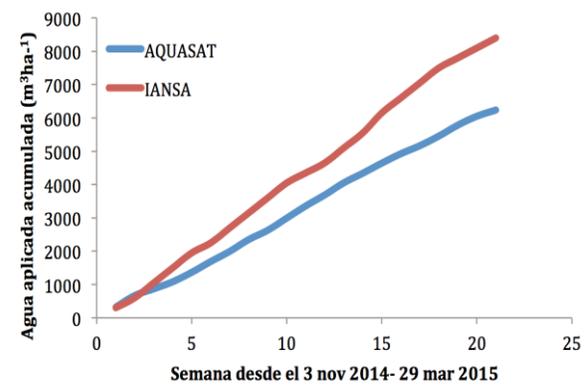
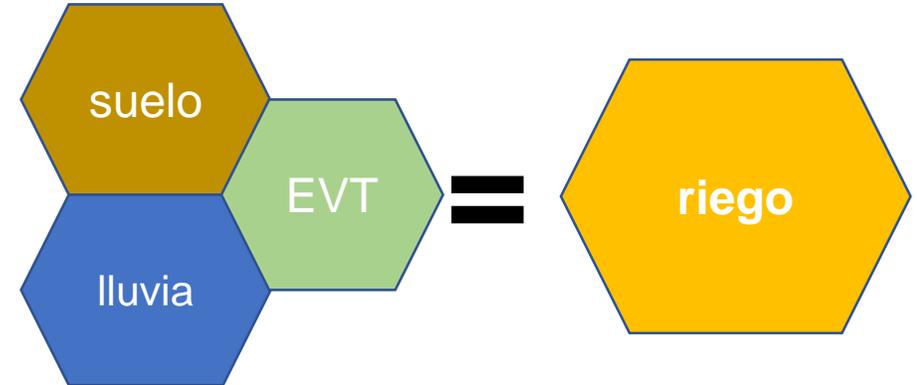
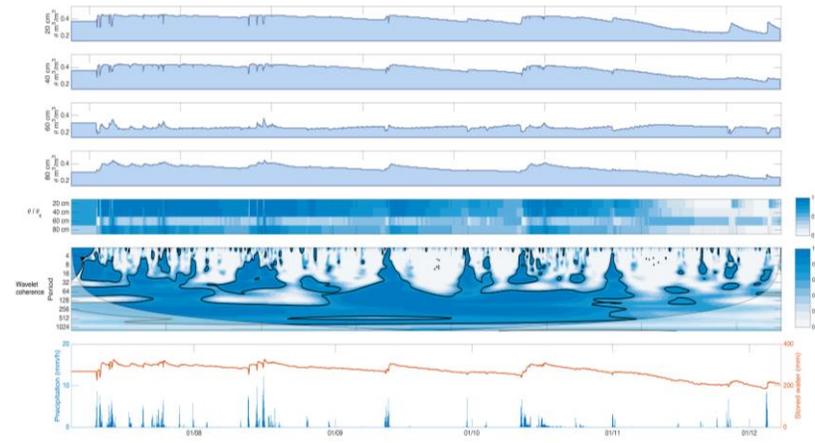
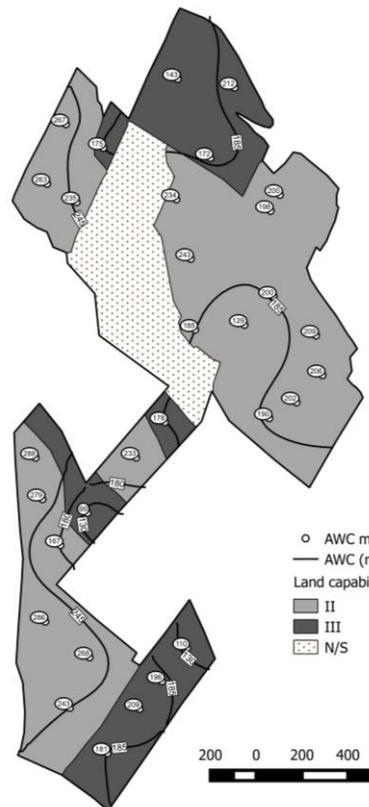


Furrow



40 %
Efficiency





Para finalizar

- ¿Qué sucedería si colocamos precio al agua?
- ¿Tenemos un valor plausible para el precio del agua?
- ¿Cómo encajamos valor y precio del agua?
- ¿Cómo incentivamos BPA's y acciones de mitigación?
- ¿Cómo traducimos estos puntos a política pública?
- ¿Cómo traducimos política pública a acciones de manejo?
- ¿Cuál es el efecto de la *calidad* del agua?

Implementar estrategias de manejo es por lejos más complejo que definir una política pública

Mejor manejo es clave en aspectos de sustentabilidad

Manejo de almacenaje: natural y artificial.