**Near-surface wind speed trends and variability over the Antarctic Peninsula, 1979-2022**

Miguel Andres-Martin1,2\*, Cesar Azorin-Molina1, Encarna Serrano2, Sergi Gonzalez-Herrero3,4, Jose A. Guijarro5, Shalenys Bedoya-Valestt1, Eduardo Utrabo-Carazo1, Sergio M. Vicente Serrano6

*1Centro de Investigaciones sobre Desertificación, Consejo Superior de Investigaciones*

*Científicas (CIDE, CSIC-UV-Generalitat Valenciana), Climate, Atmosphere and Ocean Laboratory (Climatoc-Lab), Moncada, Valencia, Spain*

*2Facultad CC. Físicas, Universidad Complutense de Madrid, Madrid, Spain*

*3 Antarctic Group, State Meteorological Agency (AEMET), Barcelona, Spain*

*4WSL Institute for Snow and Avalanche Research SLF, Davos, Switzerland*

*5Retired from the State Meteorological Agency (AEMET), Balearic Islands Office, Palma de Mallorca, Spain*

*6Instituto Pirenaico de Ecología, Consejo Superior de Investigaciones Científicas (IPE–CSIC), Zaragoza, Spain*

*Corresponding author*: Miguel Andres-Martin, Centro de Investigaciones sobre Desertificación, Consejo Superior de Investigaciones Científicas (CIDE-CSIC-UV-GVA), Ctra. CV-315 km 10.7, 46113 Moncada, Valencia, Spain. E-mail: miguel.andres@csic.es

**Supplementary material**

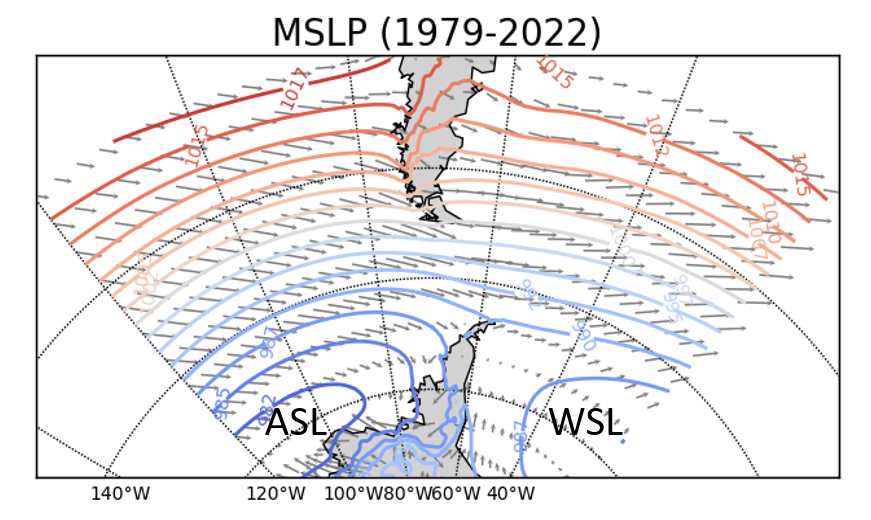
**Tables**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Station | Source | Country | Lon. (Decº) | Lat. (Decº) | Lon. (Decº) ERA5 | Lon. (Decº) ERA5 | Period | Elevation a.s.l. (m) |
| Bellingshausen | SCAR MET-READER | Russia | 58.96 W | 62.20 S | 59.00 W | 62.25 S | 1968-2019 | 16 |
| Esperanza | SCAR MET-READER | Argentina | 57.00 W | 63.40 S | 57.00 W | 63.50 S | 1957-2019 | 13 |
| Faraday/Vernadsky | SCAR MET-READER | UK/Ukraine | 64.40 W | 65.40 S | 64.50 W | 65.50 S | 1950-2019 | 11 |
| Juan Carlos I | AEMET | Spain | 60.40 W | 62.70 S | 60.50 W | 62.75 S | 1988-2019 | 12 |
| Marambio | SCAR MET-READER | Argentina | 56.63 W | 64.23 S | 56.50 W | 64.25 S | 1971-2019 | 198 |
| Marsh | SCAR MET-READER | Chile | 58.90 W | 62.20 S | 59.00 W | 62.25 S | 1970-2019 | 10 |
| Rothera | SCAR MET-READER | UK | 68.10 W | 67.50 S | 68.00 W | 67.50 S | 1977-2019 | 32 |
| San Martin | SCAR MET-READER | Argentina | 67.10 W | 68.10 S | 67.00 W | 68.00 S | 1977-2019 | 4 |

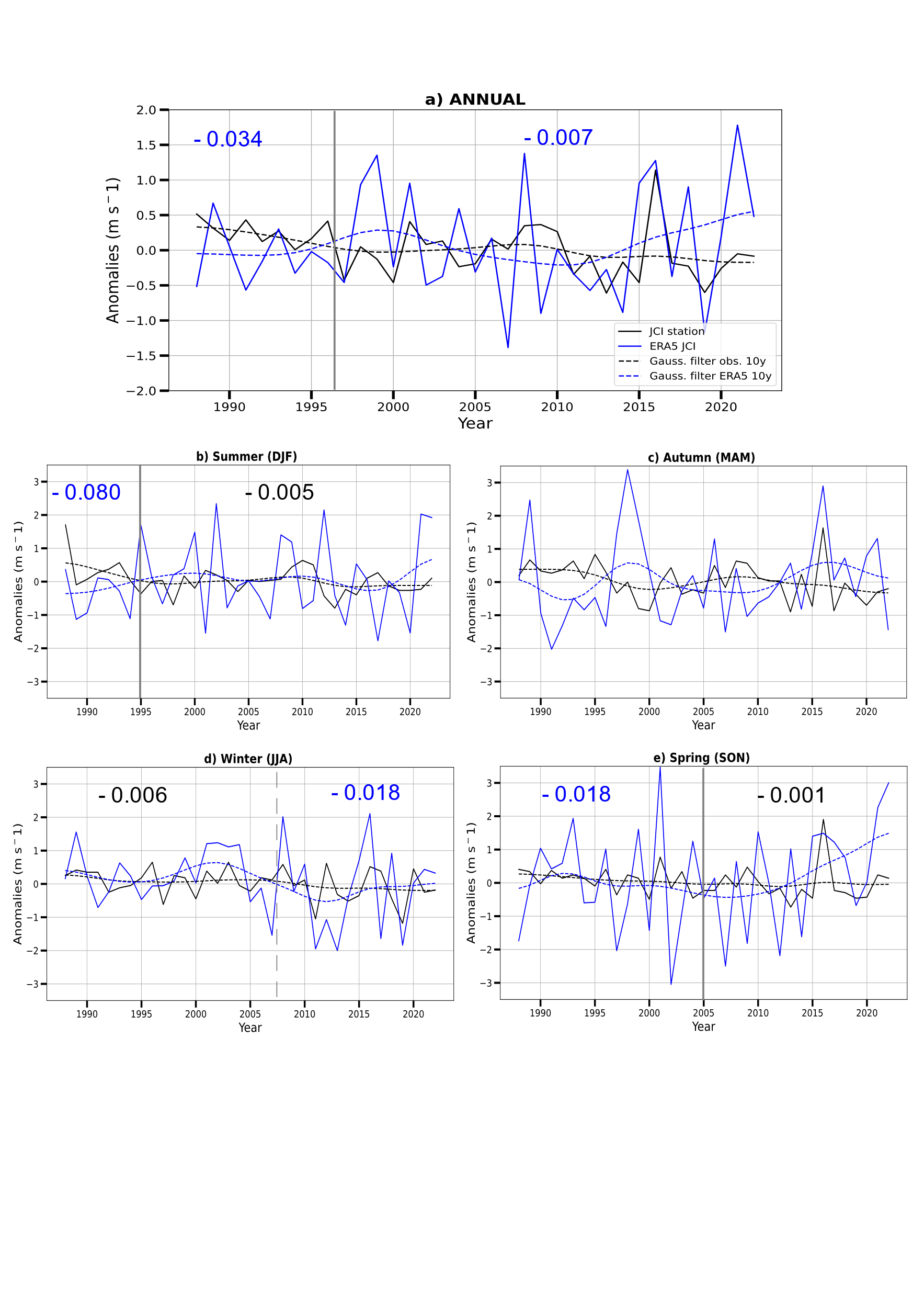
Table S1. Description of the meteorological stations used across the northern Antarctic Peninsula.

**Figures**

[Fig. S1.](#_bookmark50) Mean Sea level Pressure compute using ERA5 data for 1979-2022. ASL refers to Amundsen Bellingshausen Sea Low and WSL to Weddle Sea Low. The vectors show the direction and strength of the SWS anomalies.



[Fig. S2.](#_bookmark50) Annual and seasonal SWS anomalies (in m s-1) for JCI (black line) and ERA5 in the nearest grid point (blue line). The 10-yr Gaussian low-pass filters for both datasets are shown in dashed lines. A vertical solid and dash line shows the breakpoint year (*p<*0.05 and *p<*0.10 respectively, no line for *p>*0.10). The value of SWS anomaly trends (in m s-1 dec-1) before and after the breakpoint are shown, colored if statistically significant (*p*<0.05). Notice that the Y-axes range differs between the annual and seasonal plots.



[Fig. S3.](#_bookmark50) Annual and seasonal regional mean (without JCI due to the different timespan) SWS (in m s-1) for observations (black line) and ERA5 in the nearest grid point (blue line) for 1979-2022.

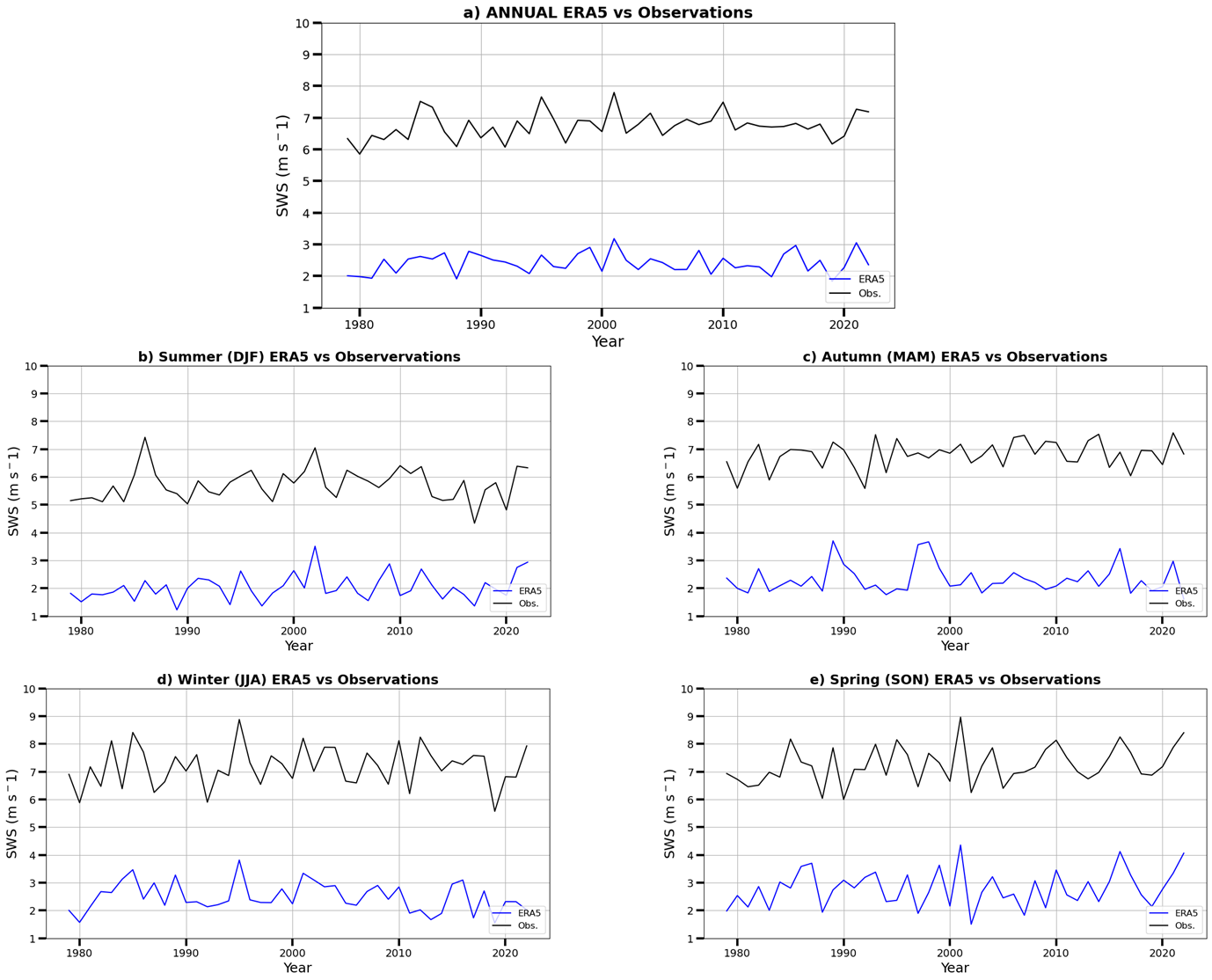
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Fig. S4. Pearson correlation coefficient (*r*) between (a) SWS anomalies of the observational and (b) closest ERA5 grid points and the SAM index for 1979-2022. The asterisk in JCI indicates the different study period (1988-2022). Underlined values indicate statistical significance at *p<*0.10, and boxed values at *p<*0.05.



Fig. S5. Annual and seasonal regional mean (without JCI due to the different timespan) SWS anomalies (in m s-1) observations (blue line) and the SAM index (red line). The 10-yr Gaussian low-pass filters for both datasets are shown in dashed lines. A vertical solid and dashed line indicate the breakpoint year for SWS regional mean anomalies (*p*<0.05 and *p*<0.10 respectively).

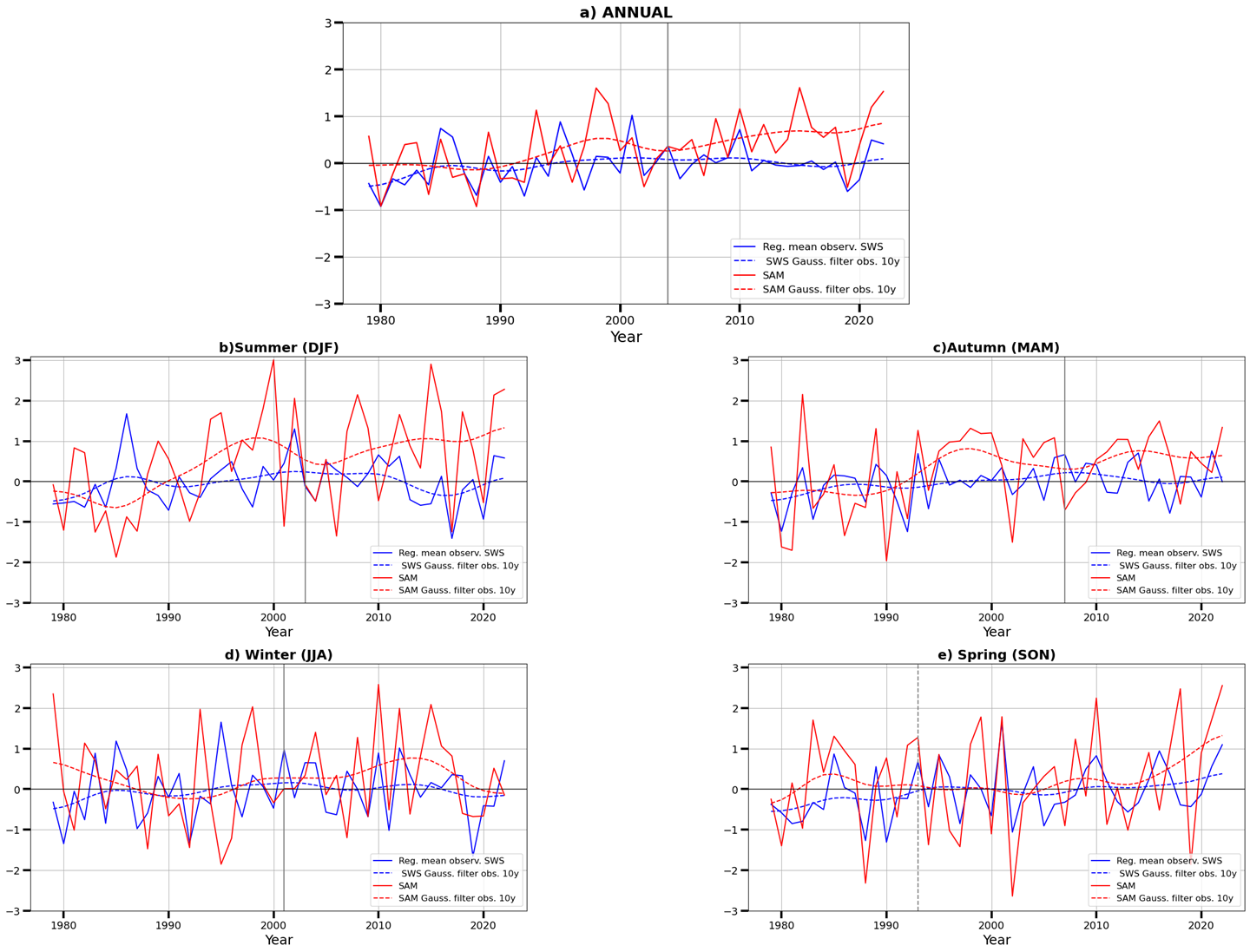


Fig. S6. Pearson correlation coefficient (*r*) between (a) SWS anomalies of the observational and (b) closest ERA5 grid points and the SOI index for 1979-2022. The asterisk in JCI indicates the different study period (1988-2022). Underlined values indicate statistical significance at *p<*0.10, and boxed values at *p<*0.05.

