



Supplement of

Impact of wind variations on surface variability over the Patagonian Continental Shelves

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Supplementary

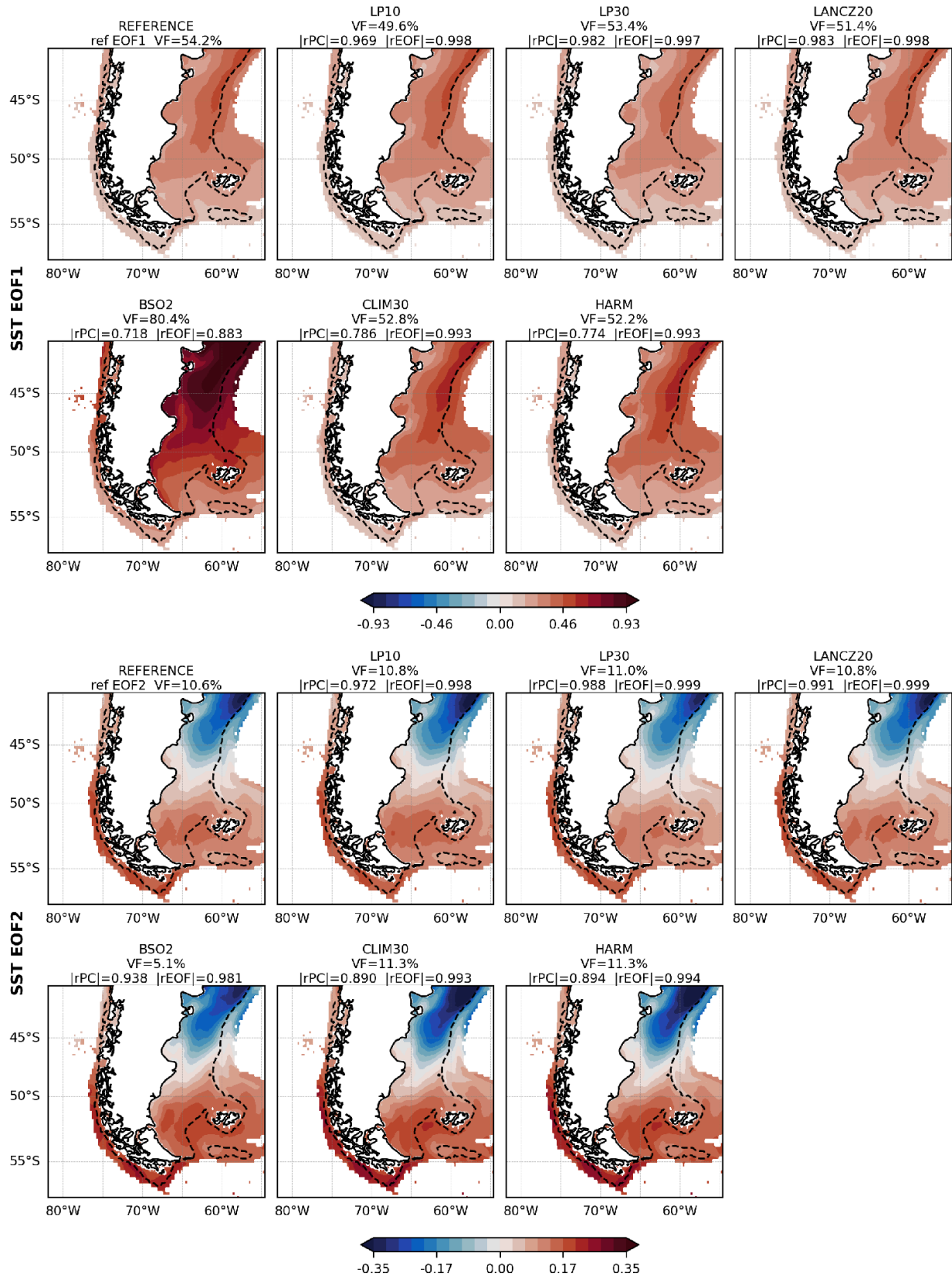


Figure S1: Sensitivity of the first two EOF modes of SSTa to the preprocessing choices. REFERENCE is the preprocessing configuration used in the study; LP10 and LP30 use 10- and 30-day second-order Butterworth low-pass filters; LANCZ20 uses a 20-day Lanczos low-pass filter; BSO2 uses a second-order Butterworth band-stop filter between 150 and 400 days; CLIM30 removes a 30-day-smoothed daily climatology; and HARM removes the annual and semiannual harmonics. The upper two rows and lower two rows show EOF1 and EOF2, respectively. VF is the variance explained by each mode; |rEOF| is the absolute spatial correlation with the corresponding reference EOF; and |rPC| is the absolute spatial correlation between the corresponding principal components after matching the modes and their signs. The black dashed line indicates the 200-m isobath.

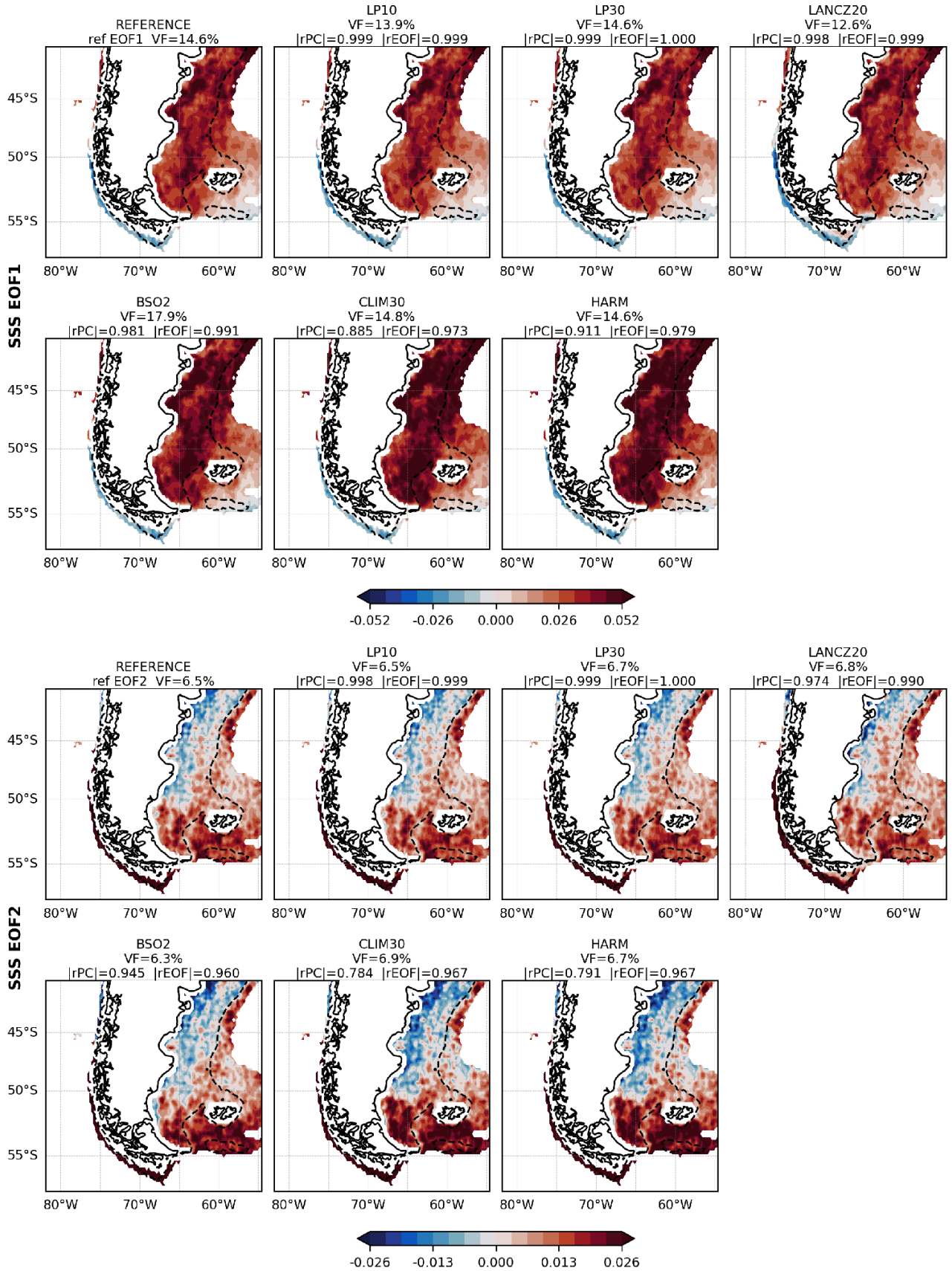


Figure S2: Sensitivity of the first two EOF modes of SSSa to the preprocessing choices. REFERENCE is the preprocessing configuration used in the study; LP10 and LP30 use 10- and 30-day second-order Butterworth low-pass filters; LANCZ20 uses a 20-day Lanczos low-pass filter; BSO2 uses a second-order Butterworth band-stop filter between 150 and 400 days; CLIM30 removes a 30-day-smoothed daily climatology; and HARM removes the annual and semiannual harmonics. The upper two rows and lower two rows show EOF1 and EOF2, respectively. VF is the variance explained by each mode; |rEOF| is the absolute spatial correlation with the corresponding reference EOF; and |rPC| is the absolute correlation between the corresponding principal components after matching the modes and their signs. The black dashed line indicates the 200-m isobath.

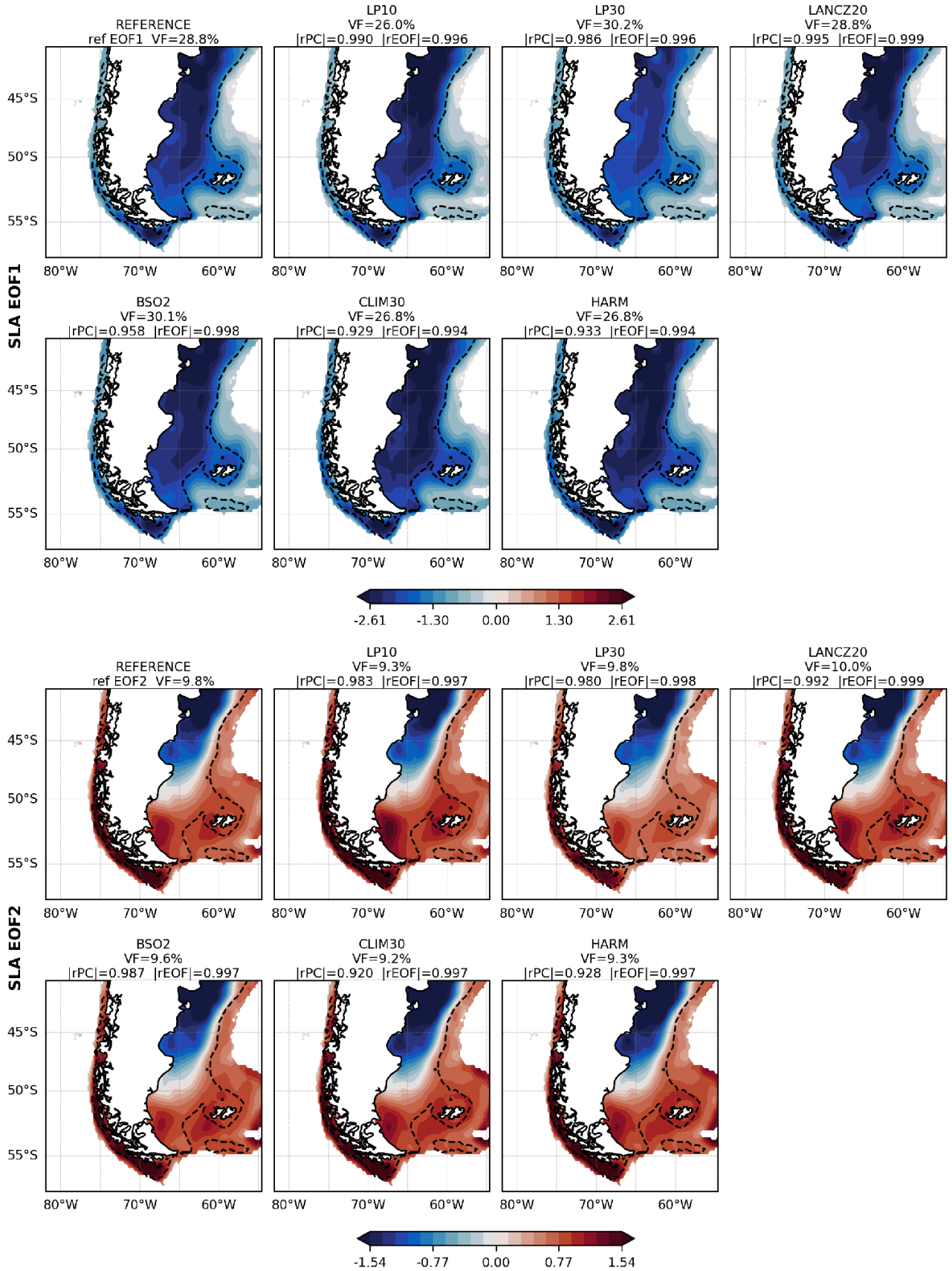


Figure S3: Sensitivity of the first two EOF modes of SLAa to the preprocessing choices. REFERENCE is the preprocessing configuration used in the study; LP10 and LP30 use 10- and 30-day second-order Butterworth low-pass filters; LANCZ20 uses a 20-day Lanczos low-pass filter; BSO2 uses a second-order Butterworth band-stop filter between 150 and 400 days; CLIM30 removes a 30-day-smoothed daily climatology; and HARM removes the annual and semiannual harmonics. The upper two rows and lower two rows show EOF1 and EOF2, respectively. VF is the variance explained by each mode; |rEOF| is the absolute spatial correlation with the corresponding reference EOF; and |rPC| is the absolute correlation between the corresponding principal components after matching the modes and their signs. The black dashed line indicates the 200-m isobath.

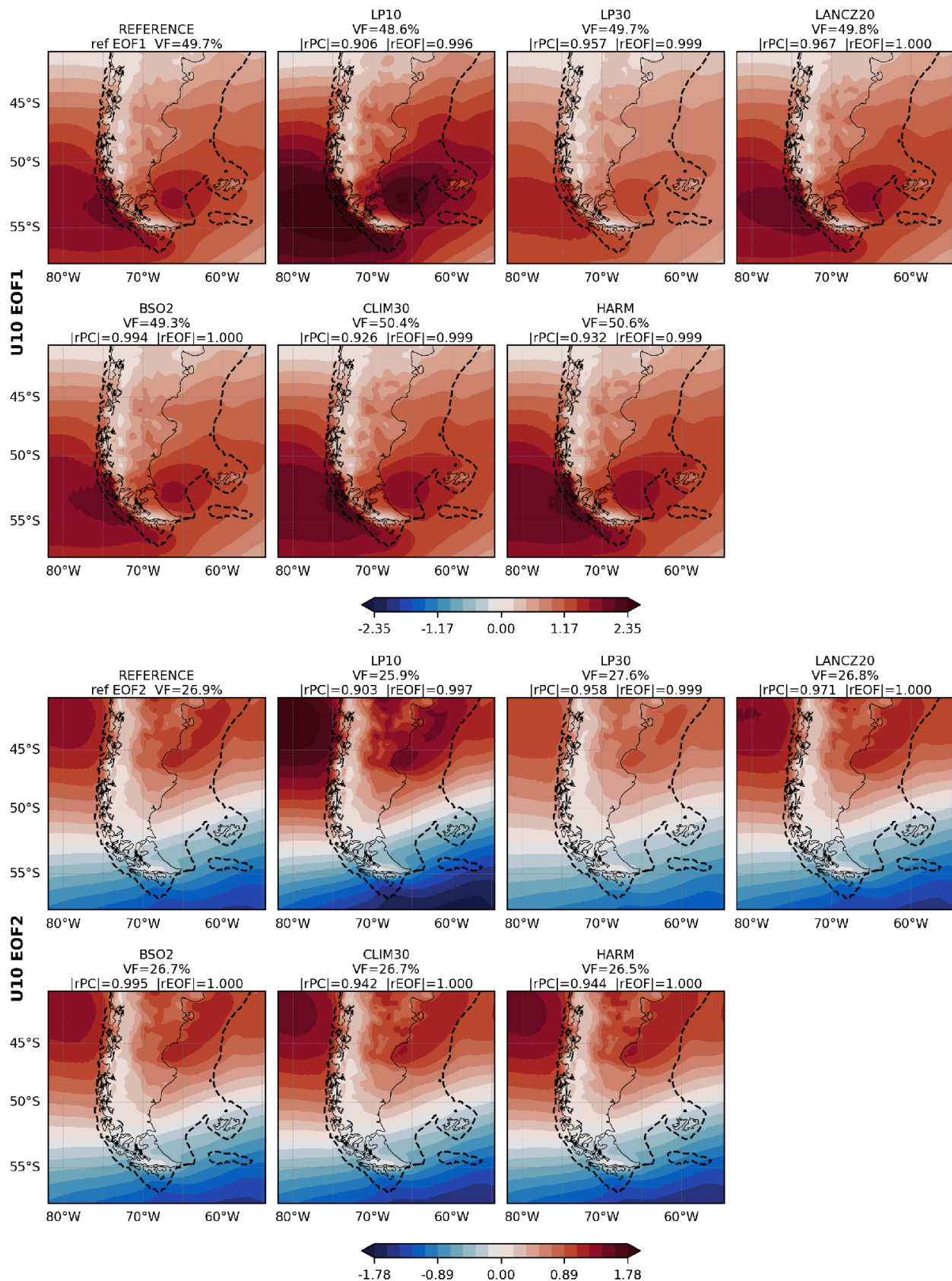


Figure S4: Sensitivity of the first two EOF modes of zonal wind anomalies (U_a) to the preprocessing choices. REFERENCE is the preprocessing configuration used in the study; LP10 and LP30 use 10- and 30-day second-order Butterworth low-pass filters; LANCZ20 uses a 20-day Lanczos low-pass filter; BSO2 uses a second-order Butterworth band-stop filter between 150 and 400 days; CLIM30 removes a 30-day-smoothed daily climatology; and HARM removes the annual and semiannual harmonics. The upper two rows and lower two rows show EOF1 and EOF2, respectively. VF is the variance explained by each mode; |rEOF| is the absolute spatial correlation with the corresponding reference EOF; and |rPC| is the absolute correlation between the corresponding principal components after matching the modes and their signs. The black dashed line indicates the 200-m isobath.

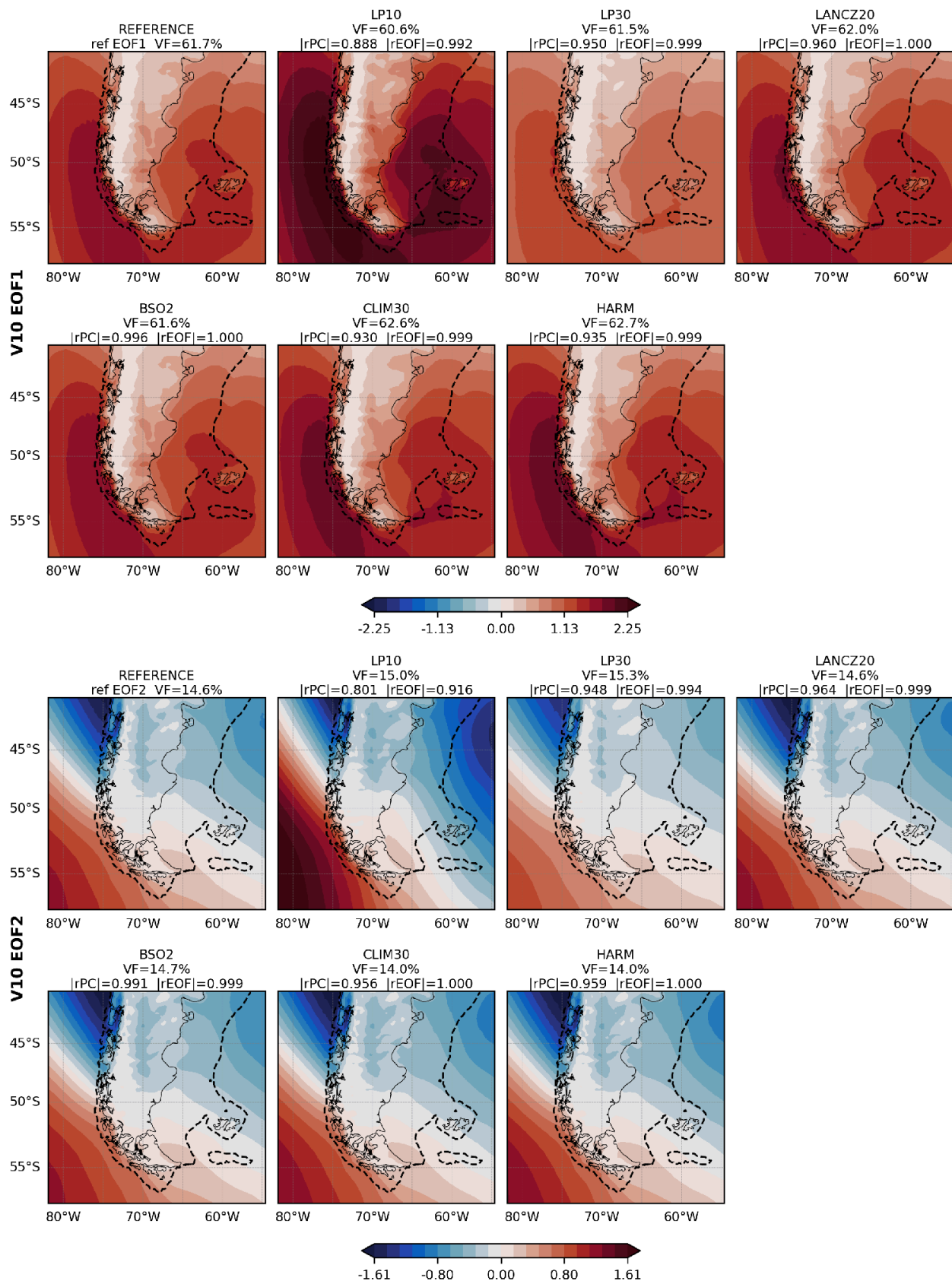


Figure S5: Sensitivity of the first two EOF modes of meridional wind anomalies (V_a) to the preprocessing choices. REFERENCE is the preprocessing configuration used in the study; LP10 and LP30 use 10- and 30-day second-order Butterworth low-pass filters; LANCZ20 uses a 20-day Lanczos low-pass filter; BSO2 uses a second-order Butterworth band-stop filter between 150 and 400 days; CLIM30 removes a 30-day-smoothed daily climatology; and HARM removes the annual and semiannual harmonics. The upper two rows and lower two rows show EOF1 and EOF2, respectively. VF is the variance explained by each mode; |rEOF| is the absolute spatial correlation with the corresponding reference EOF; and |rPC| is the absolute correlation between the corresponding principal components after matching the modes and their signs. The black dashed line indicates the 200-m isobath.

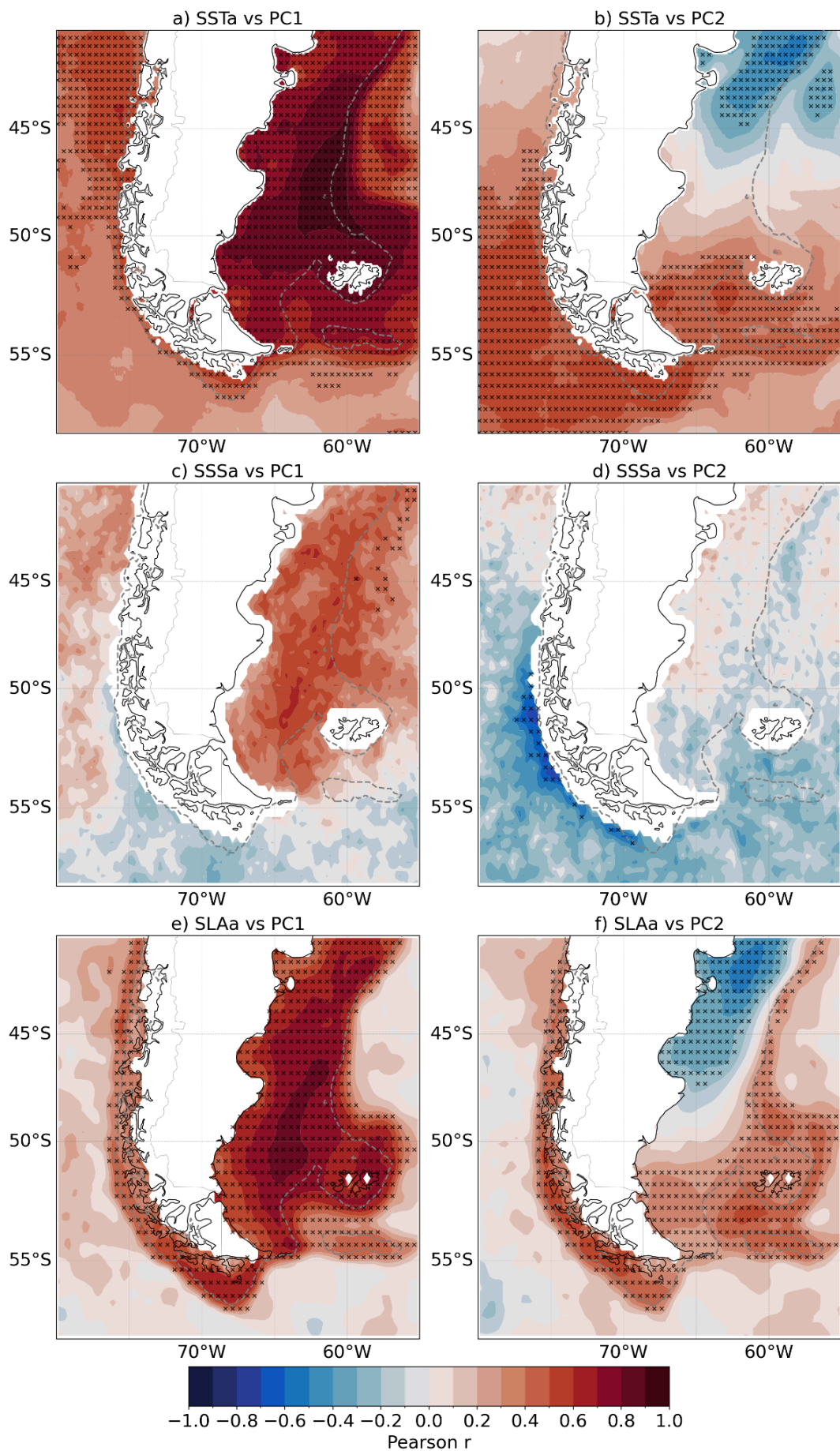


Figure S6: Maps of the Pearson correlation coefficient between each ocean anomaly field and its corresponding PC1 (left column) and PC2 (right column): SSTa (a, b), SSSa (c, d), and SLAa (e, f). Crosses indicate regions where the correlations are statistically significant. The gray dashed line indicates the 200-m isobath.

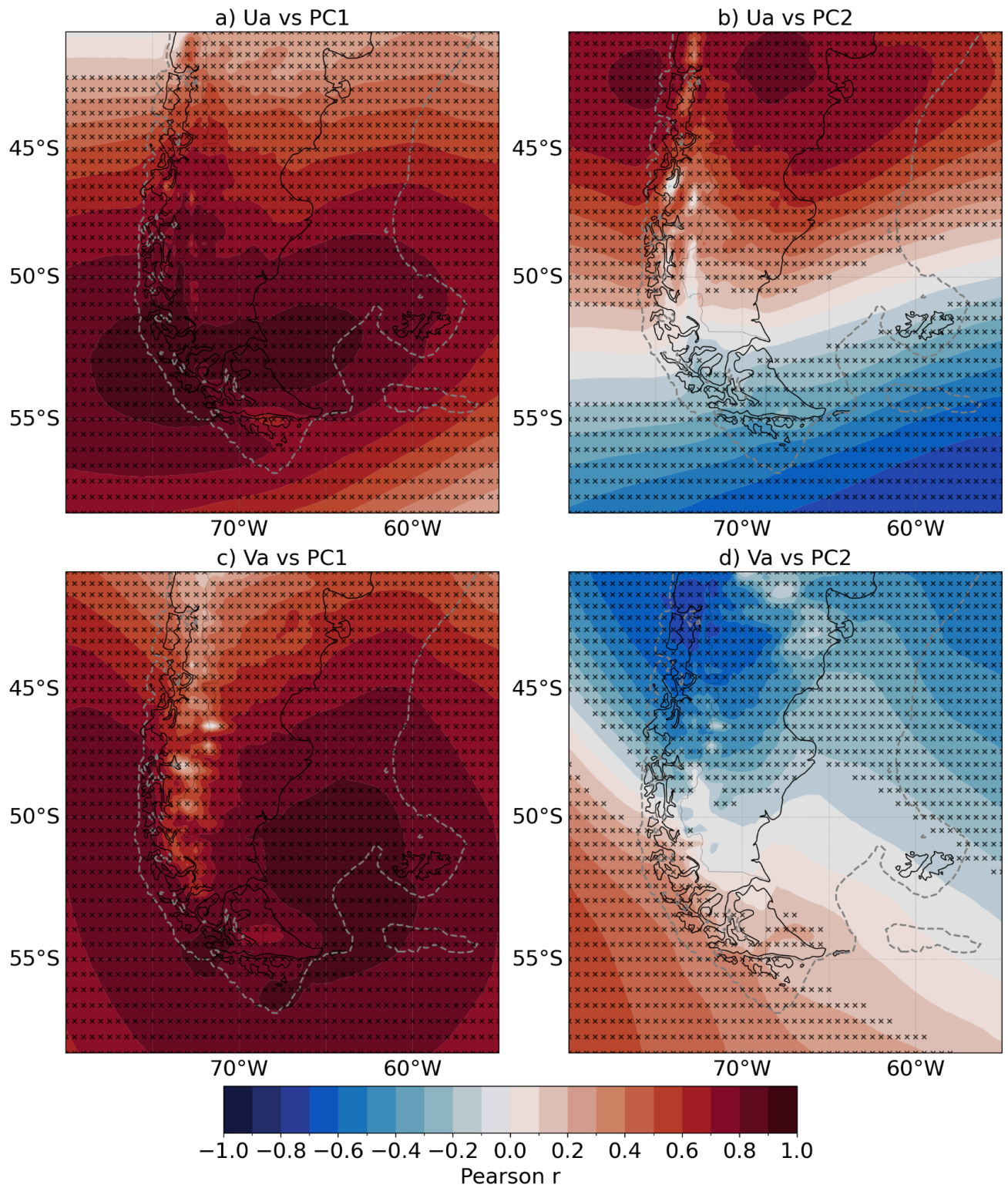


Figure S7: Maps of the Pearson correlation coefficient between each wind anomaly field and its corresponding PC1 (left column) and PC2 (right column): Ua (a, b) and Va (c, d). Crosses indicate regions where the correlations are statistically significant. The gray dashed line indicates the 200-m isobath.

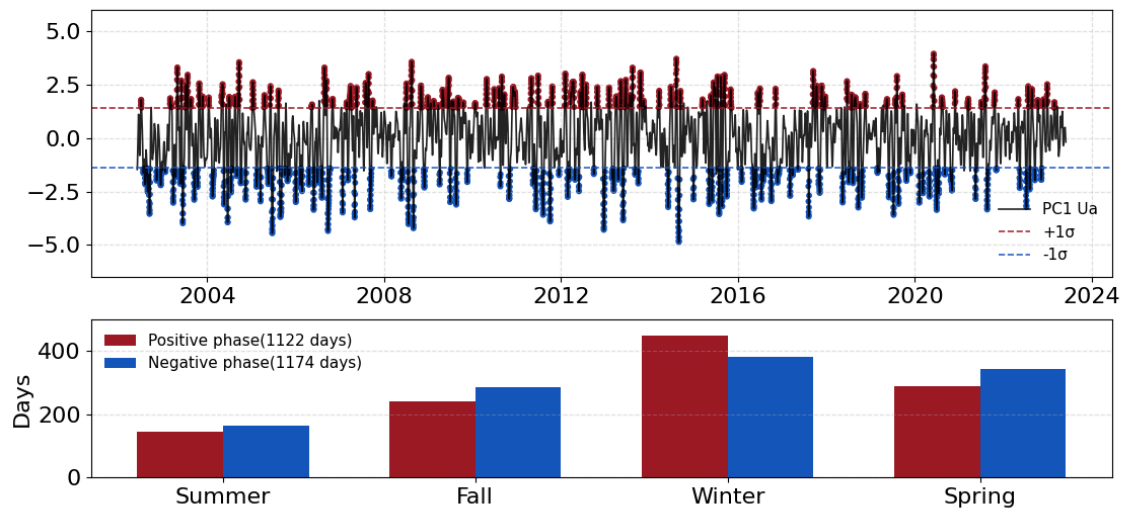


Figure S8: Top: Time series of the first principal component of the leading mode of zonal wind variability, showing the positive (red dots) and negative (blue dots) phases of this mode. Bottom: Seasonal distribution of the days corresponding to the positive and negative phases of the first mode of zonal wind variability. Red bars indicate the positive phase (increased westerlies), and blue bars indicate the negative phase (decreased westerlies).

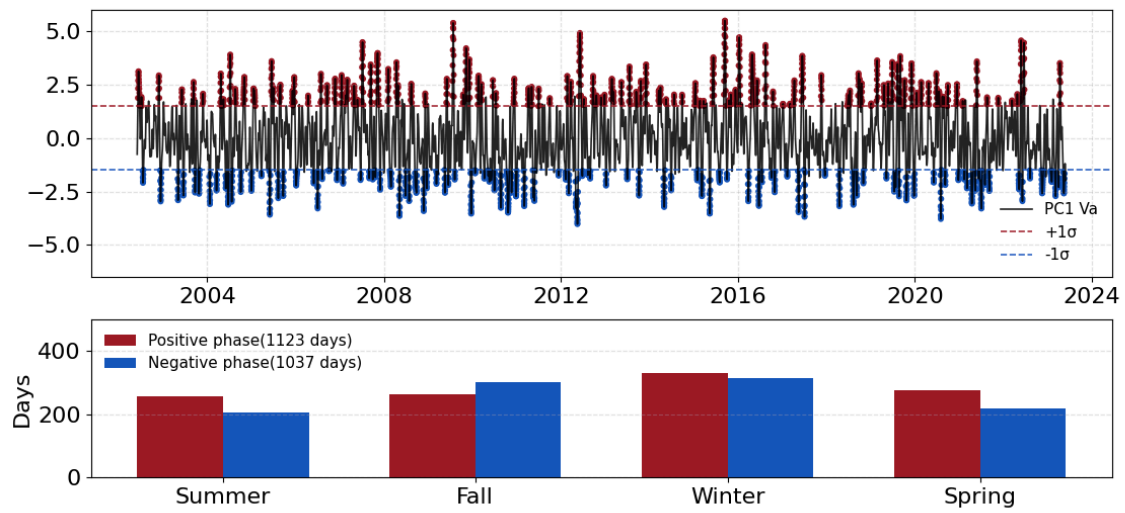


Figure S9: Top: Time series of the first principal component of the leading mode of meridional wind variability, showing the positive (red dots) and negative (blue dots) phases of this mode. Bottom: Seasonal distribution of the days corresponding to the positive and negative phases of the first mode of meridional wind variability. Red bars indicate the positive phase (southerly winds), and blue bars indicate the negative phase (northerly winds).

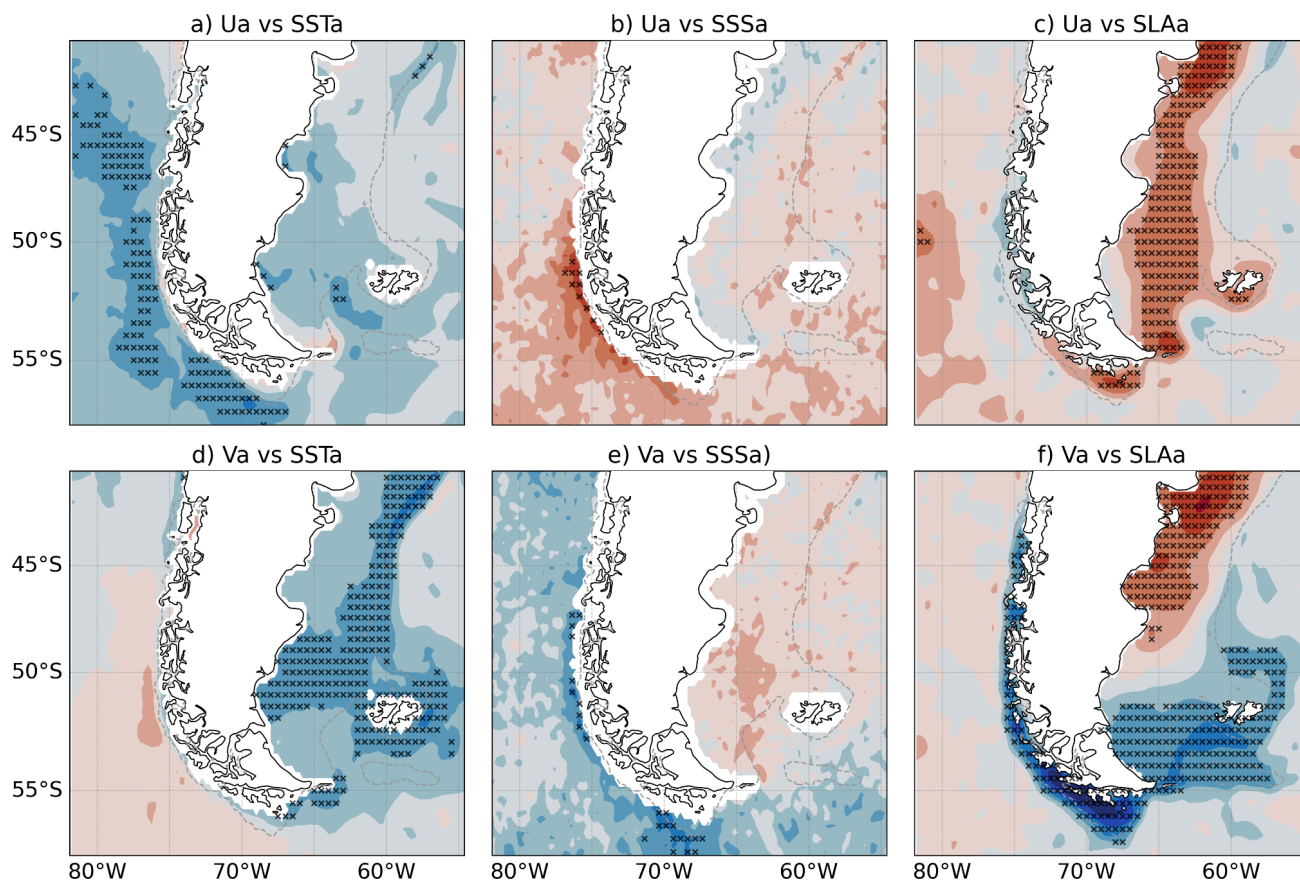


Figure S10: Maps of the Pearson correlation coefficient between anomalies of the zonal (Ua; a-c) and meridional (Va; d-f) wind components and SSTa, SSSa, and SLAa. Crosses indicate regions where the correlations are statistically significant. The gray dashed line indicates the 200-m isobath.

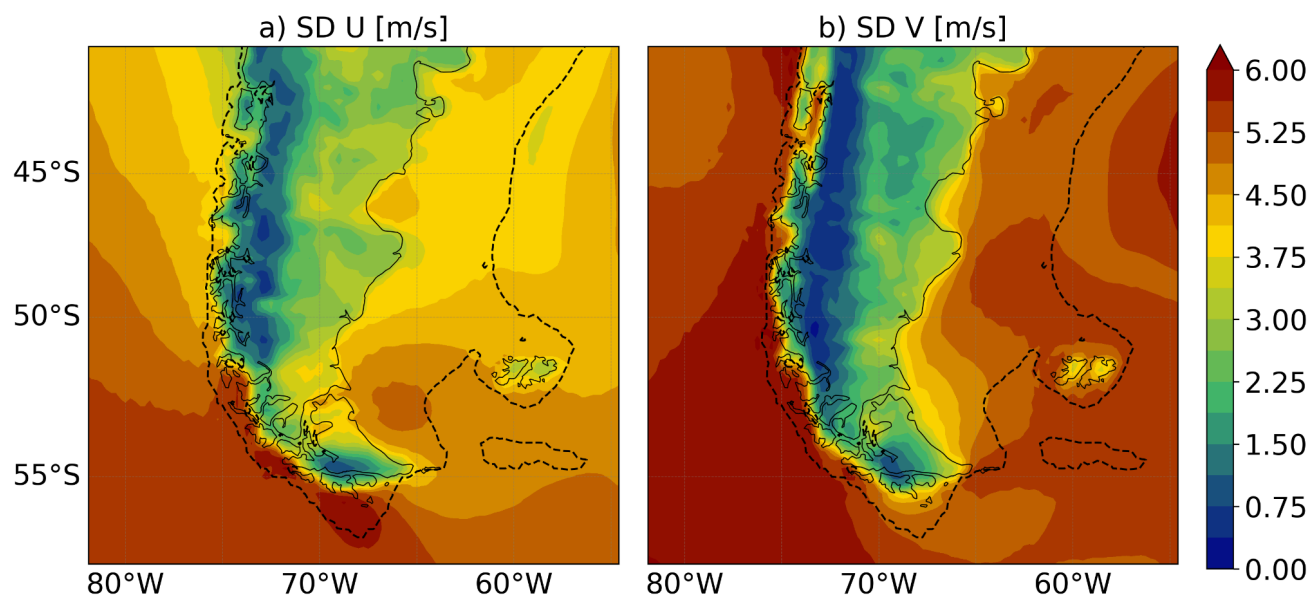


Figure S11: Standard deviation of the zonal (a) and meridional (b) wind components before application of the 20-day low-pass filter. The black dashed line indicates the 200-m isobath.

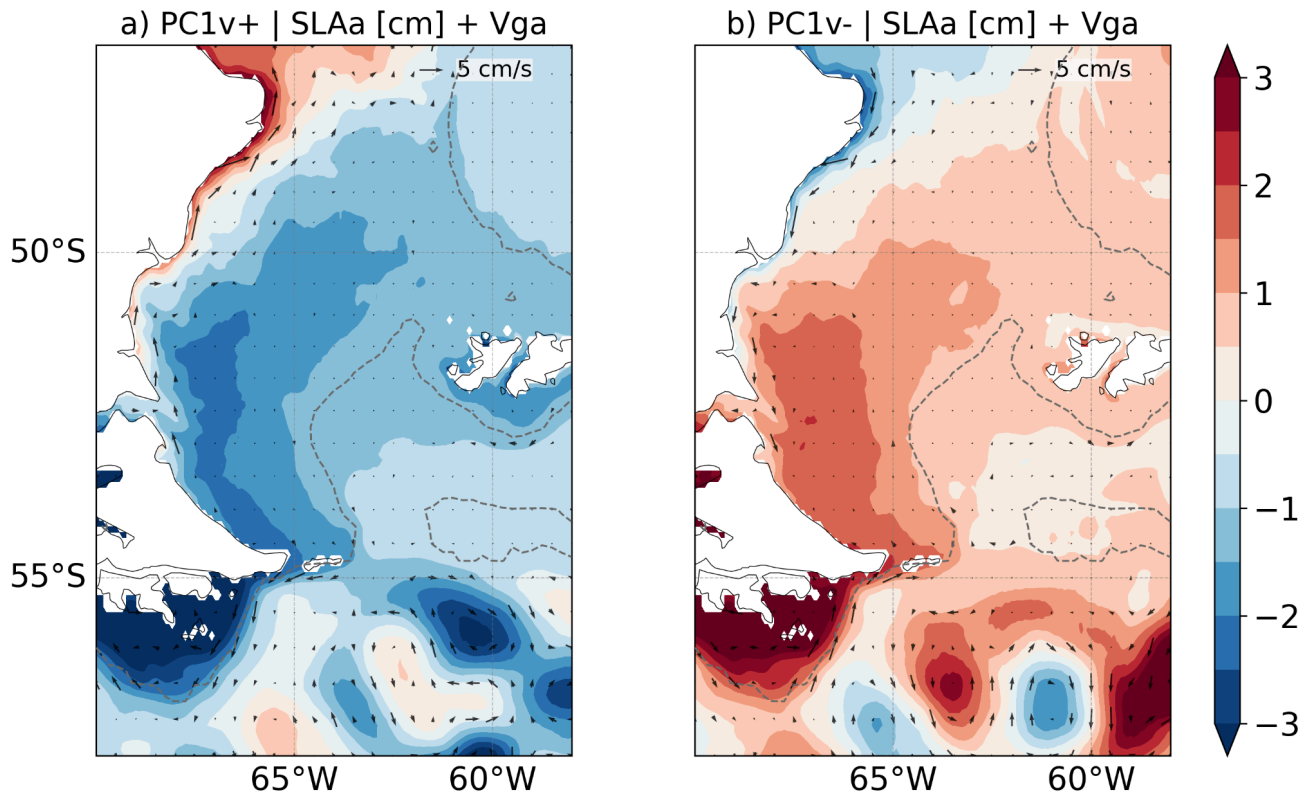


Figure S12: Zoom of the southern Atlantic shelf and Cape Horn sector, from 70° W to 58° W and from 57.5° S to 46.5° S. Sea level anomaly composites from GLORYS (SLAa; shading, cm) and the associated geostrophic velocity anomalies (Vga; arrows) are shown for the positive (a; southerly winds) and negative (b; northerly winds) phases of the leading mode of meridional wind variability (PC1-Va). The arrow scale is 5 cm s⁻¹, and the gray dashed line indicates the 200-m isobath.