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Supplement of

Modulation of the El Niño teleconnection to the North Atlantic by the tropical North Atlantic during boreal spring and summer

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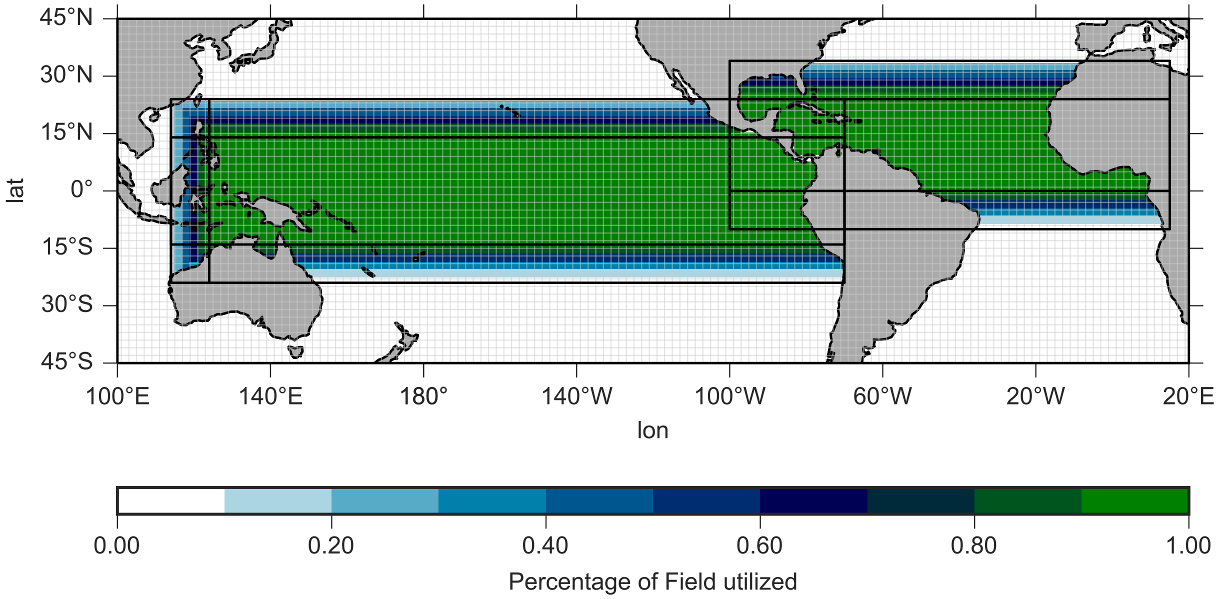

FIG. S1. Forcing area for the Pacific and Atlantic, in percentage of the regression field.

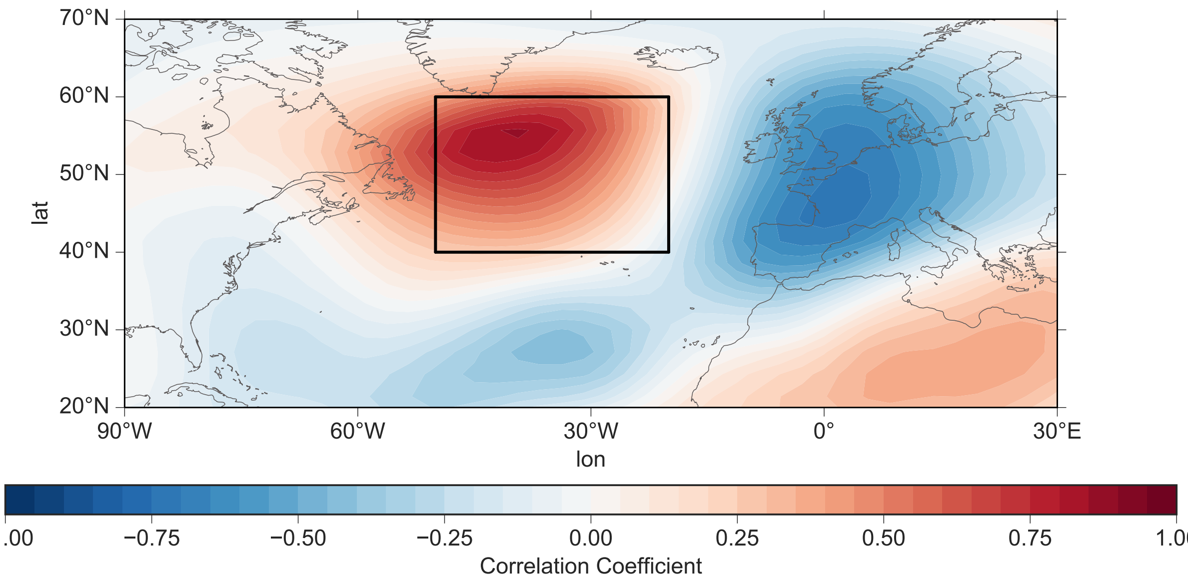

FIG. S2. EOF analysis of the second EOF for JJA 500 hPa geopotential height for the ISCA Climatological run. The black box represents the area average location for the East Atlantic pattern, and all time periods are used.

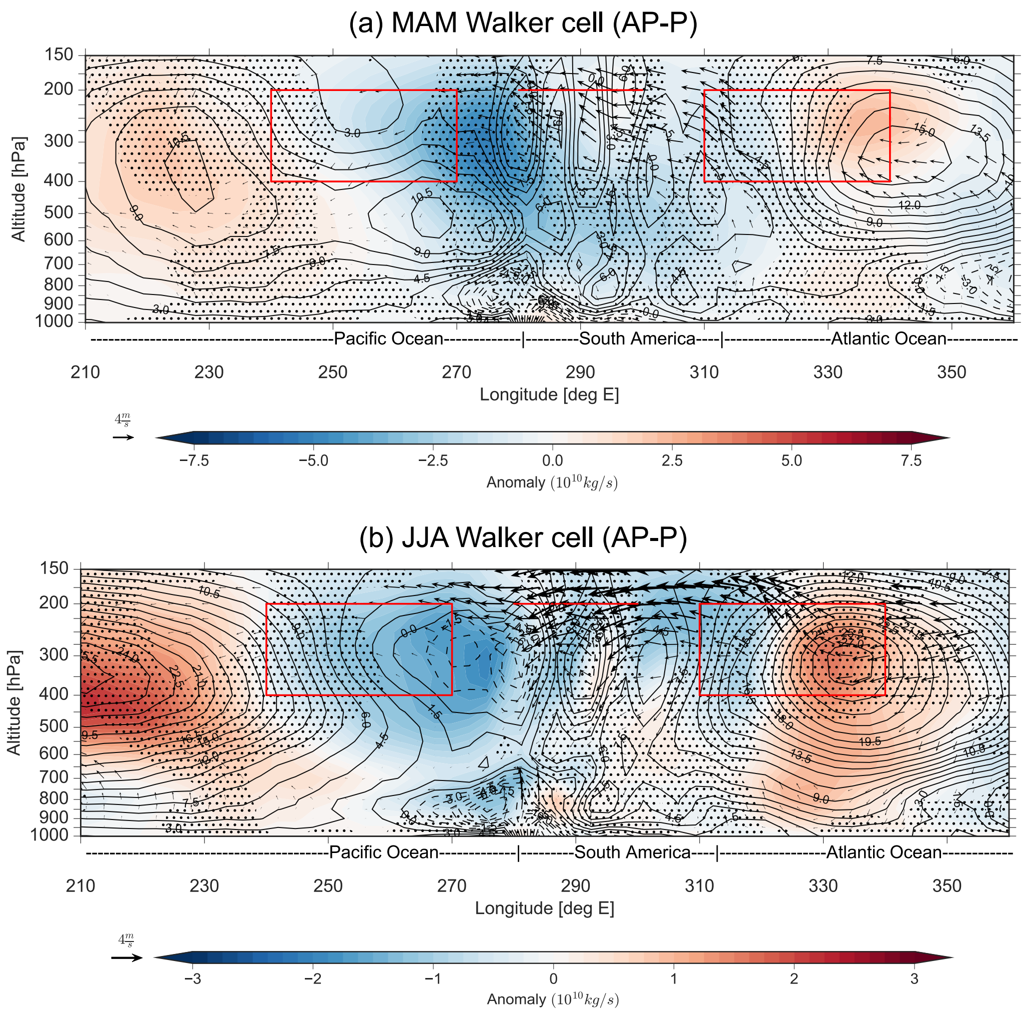

FIG. S3. MAM (a) and JJA (b) Walker Cell analysis for the region connecting the Pacific and the Atlantic, averaged between 5°S and 5°N. Shading represents the streamfunction (ψ), contours represent the streamfunction climatology (in intervals of 1.5 x 10^{10}kg/s), and vectors represent the zonal winds (u), and vertical velocity (w) response derived by the difference between AP forcing and P forcing. Stippling represents differences that are not statistically significantly different between AP and P forcing run at the 95% level using a two-tailed Monte Carlo test. The rectangular boxes represent the areas for computing the Walker index, while horizontal line represents level and longitude for RWS index. Wind vectors represent statistically different winds from between AP and P.

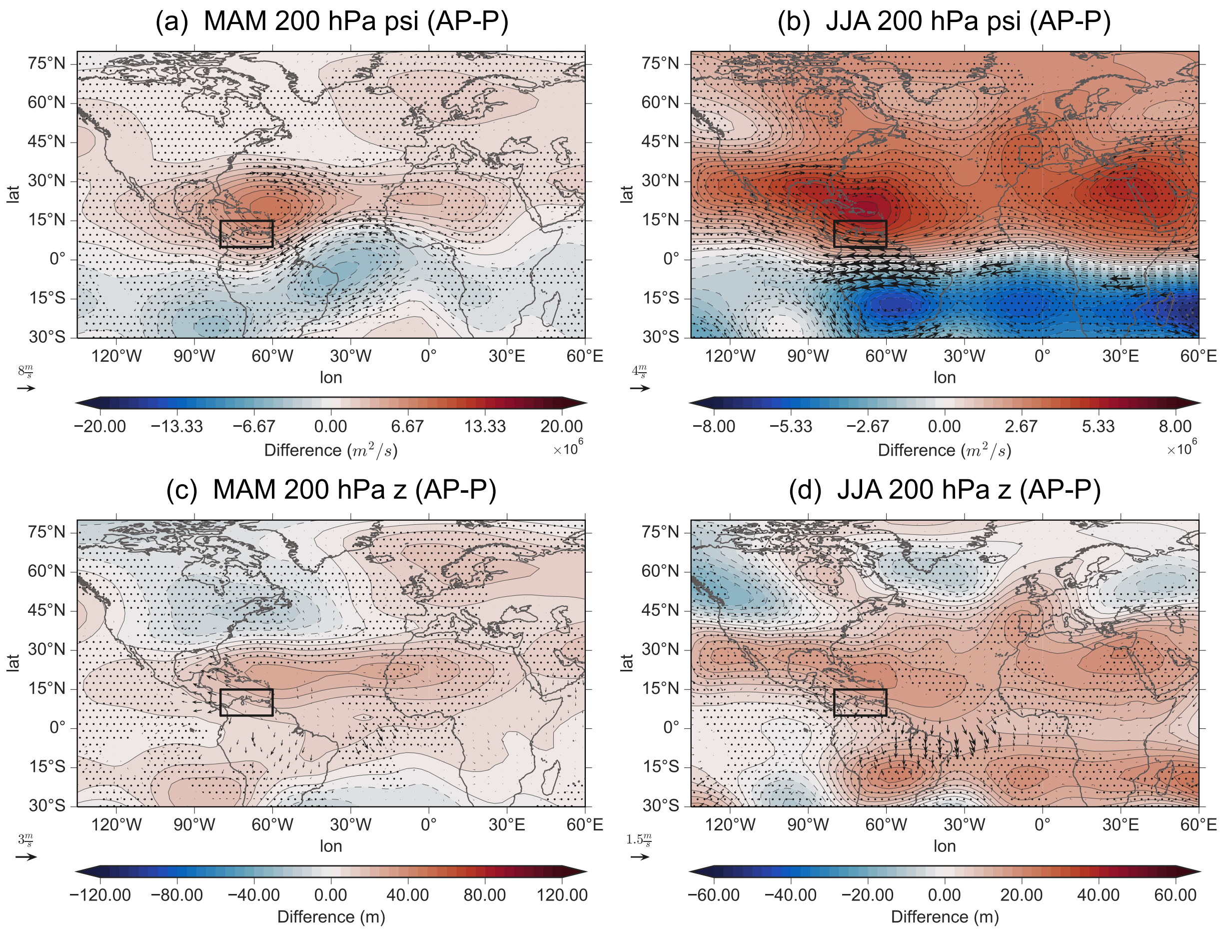

FIG. S4. MAM (a,c) and JJA (b,d) 200 hPa streamfunction (top) and geopotential height (bottom) in shading and non-divergent winds (vectors, a-b) and irrotational winds (vectors, c-d) for the response derived from the difference between AP forcing and P forcing. Stippling represents differences that are not statistically significantly different between the AP forcing and P forcing run, all at the 95% level using a two-tailed Monte Carlo test. The black box represents the RWS index over the Caribbean region. Wind vectors represent statistically significantly different winds between AP and P.

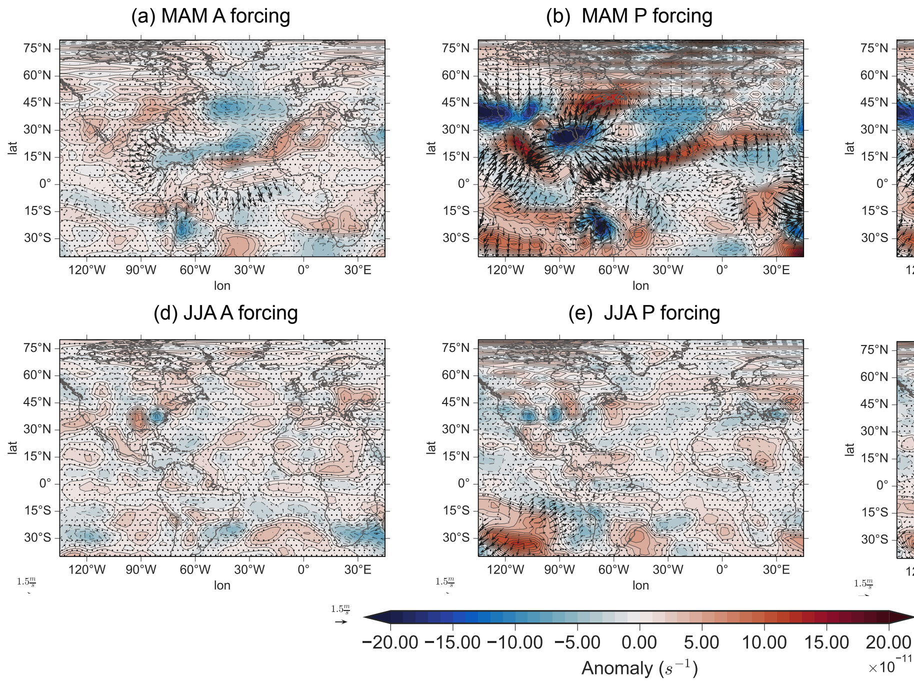

FIG. S5. Isca sensitivity experiments showing MAM and JJA 200 hPa RWS (shading, top and bottom respectively) and divergent winds (vectors) analysis for the response to the different forcings from the Atlantic (a), Pacific (b), and Atlantic+Pacific combined (c). Stippling represents anomalies that are statistically significantly different from climatology at the 95% level using a two-tailed Monte Carlo test.

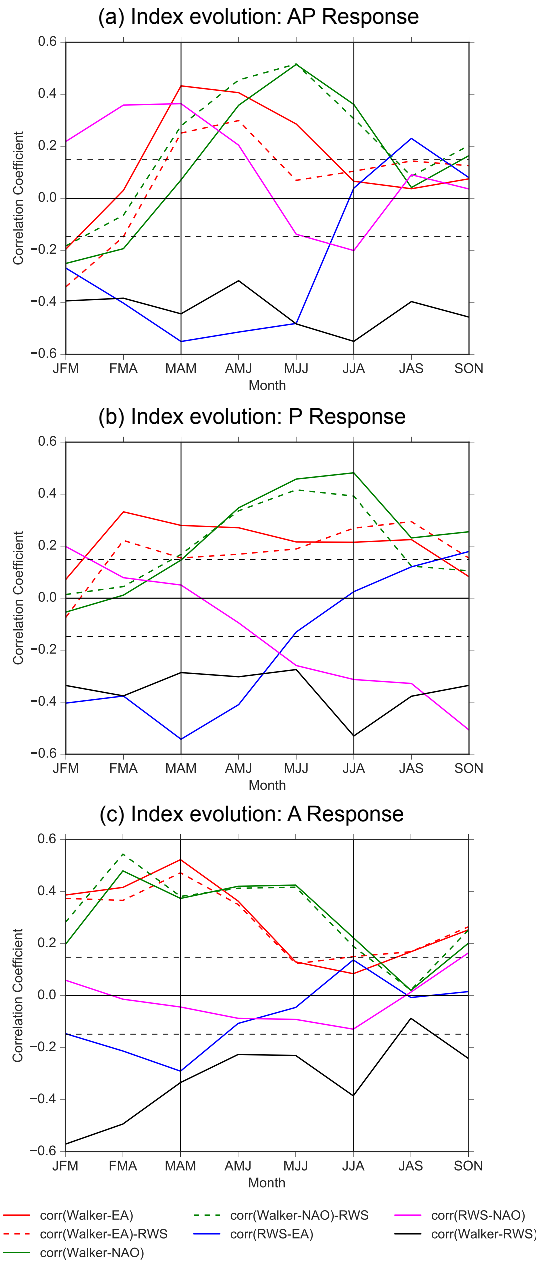

FIG. S6. Direct correlation (no lead/lag) of major indices with different forcing areas. Correlation uses results from the forced model runs, including AP (a), P (b), and A (c) responses. Bivariant correlations include the Walker index vs. East Atlantic index (solid red), Walker index vs. NAO index (solid green), RWS index vs. East Atlantic index (solid blue), and Walker index vs. RWS index. We also utilized a partial correlation to remove the RWS influence from the Walker index vs. East Atlantic (dashed red), and Walker index vs. NAO (dashed green) relationships. Horizontal black dashed lines represent the 95% confidence level using a 2-tailed test.

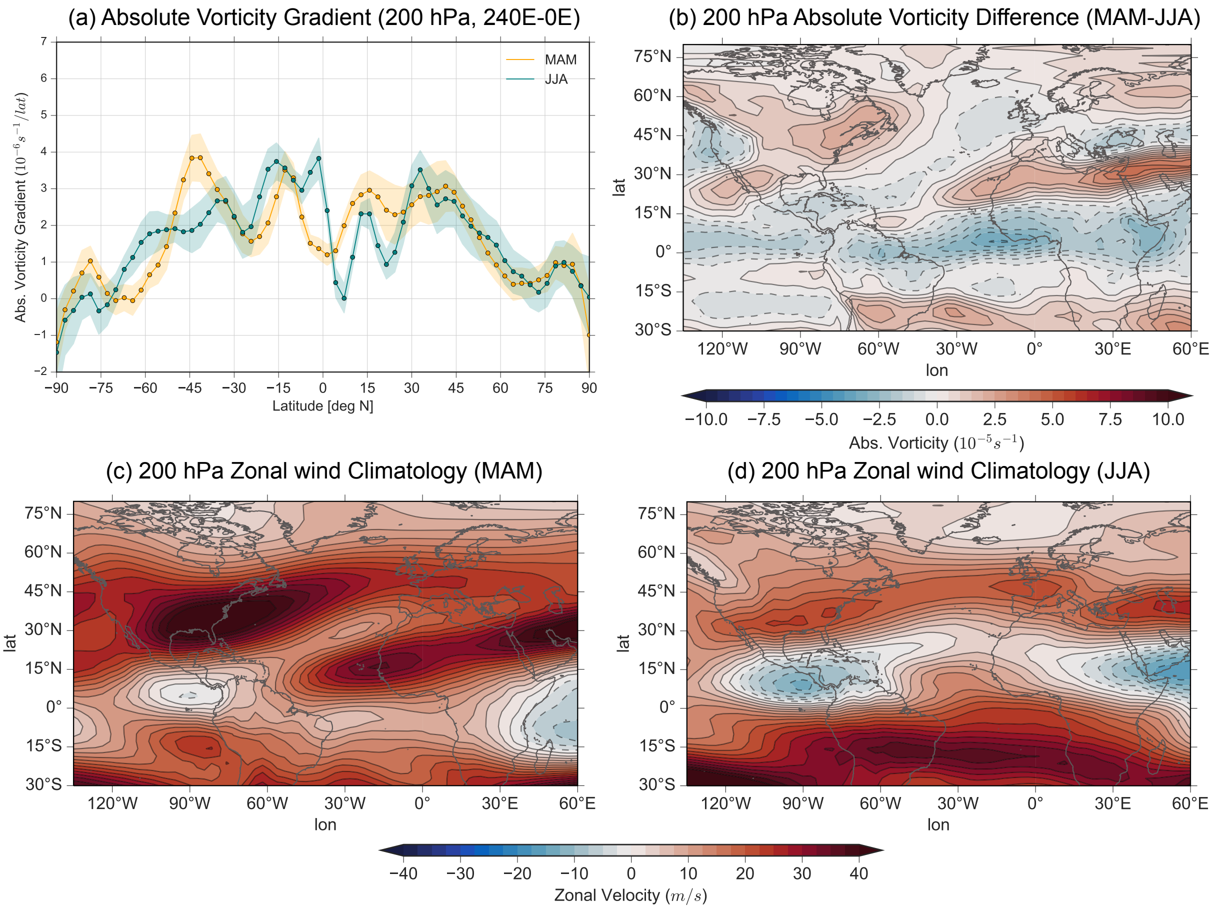

FIG. S7. Vorticity analysis for the ISCA climatological run between boreal spring and boreal summer. (a) shows the absolute vorticity gradient between 90°N/S and averaged between 240-0°. (b) shows the difference in 200 hPa absolute vorticity between MAM and JJA (MAM minus JJA), while (c-d) shows the 200 hPa zonal wind climatology for MAM and JJA, respectively.

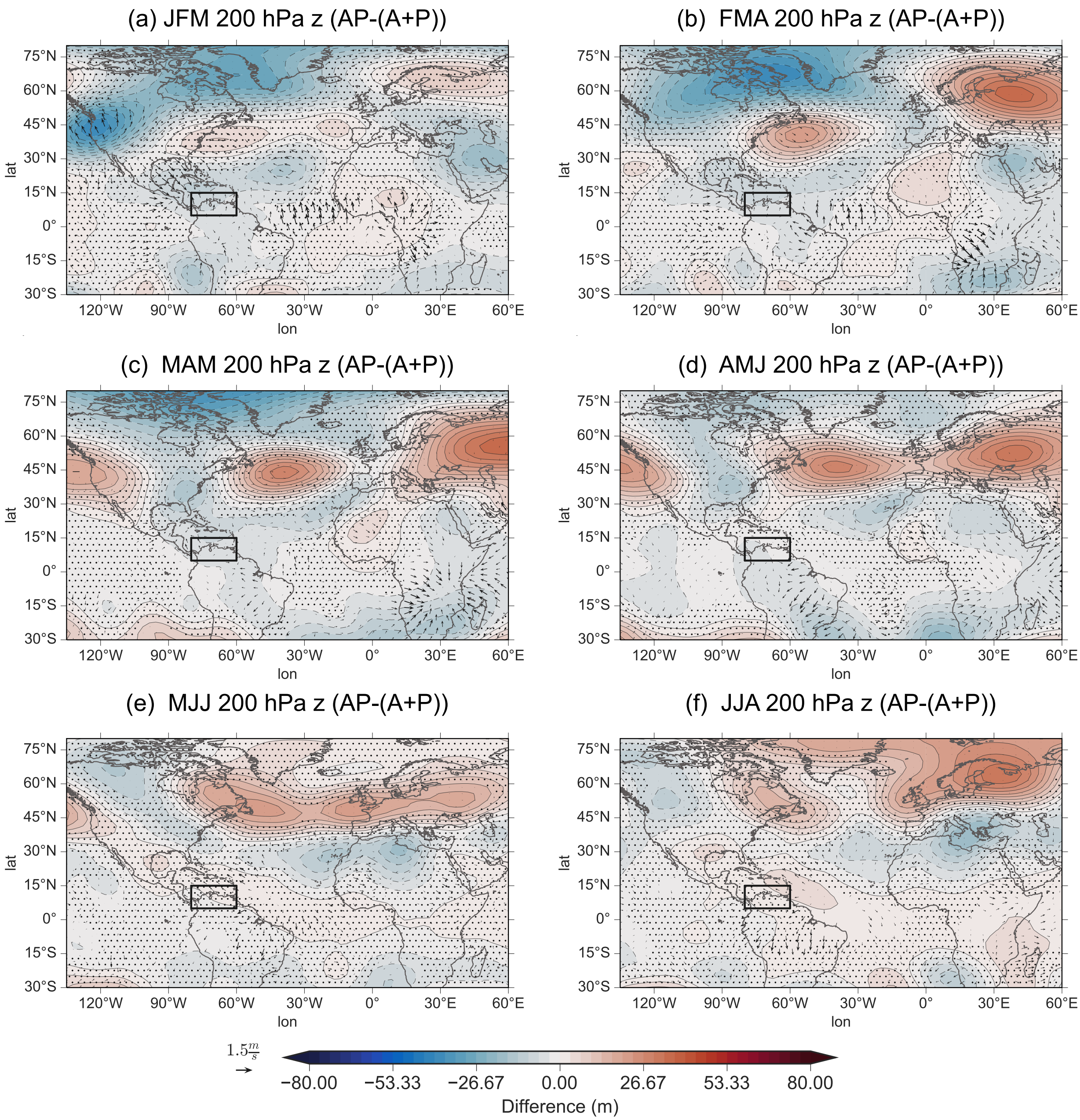

FIG. S8. JFM to JJA 200 hPa geopotential height and 200 hPa irrotational winds (vectors) difference between the linearly forced response (A+P) and the combined response (AP). Stippling in represents differences that are not statistically significantly different between the AP response and the linear combination of the Atlantic and Pacific (A+P), at the 95% level using a two-tailed Monte Carlo test. The rectangular boxes represents the Caribbean RWS index.