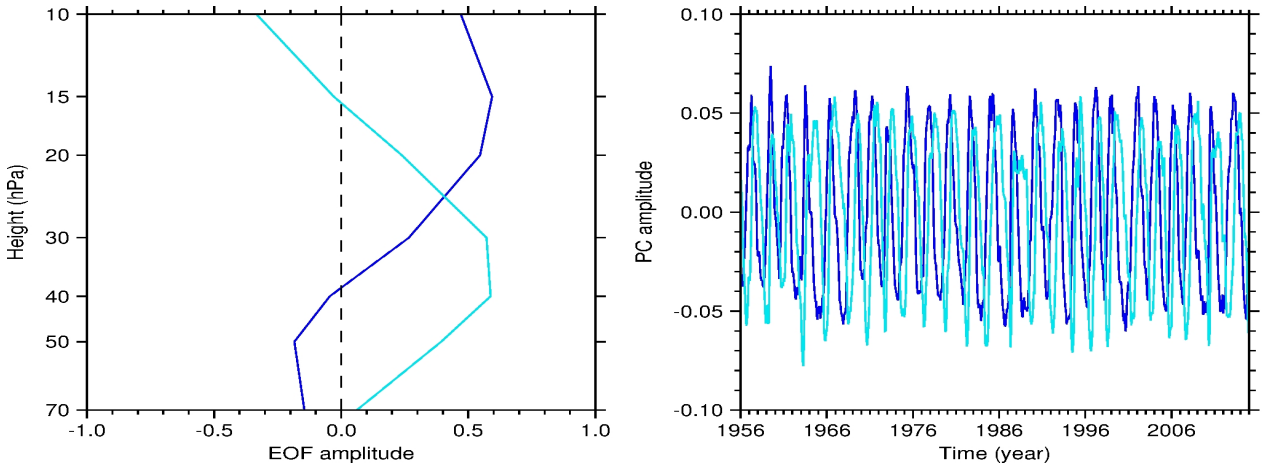

Figure S1: Height profile (left panel) and principal component time-series (right panel) of the first two Empirical Orthogonal Components (EOFs) of the FUB zonally-averaged equatorial zonal winds between 10-70 hPa for the period 1958-2016. EOF-1 is in dark blue and EOF-2 is in light blue.

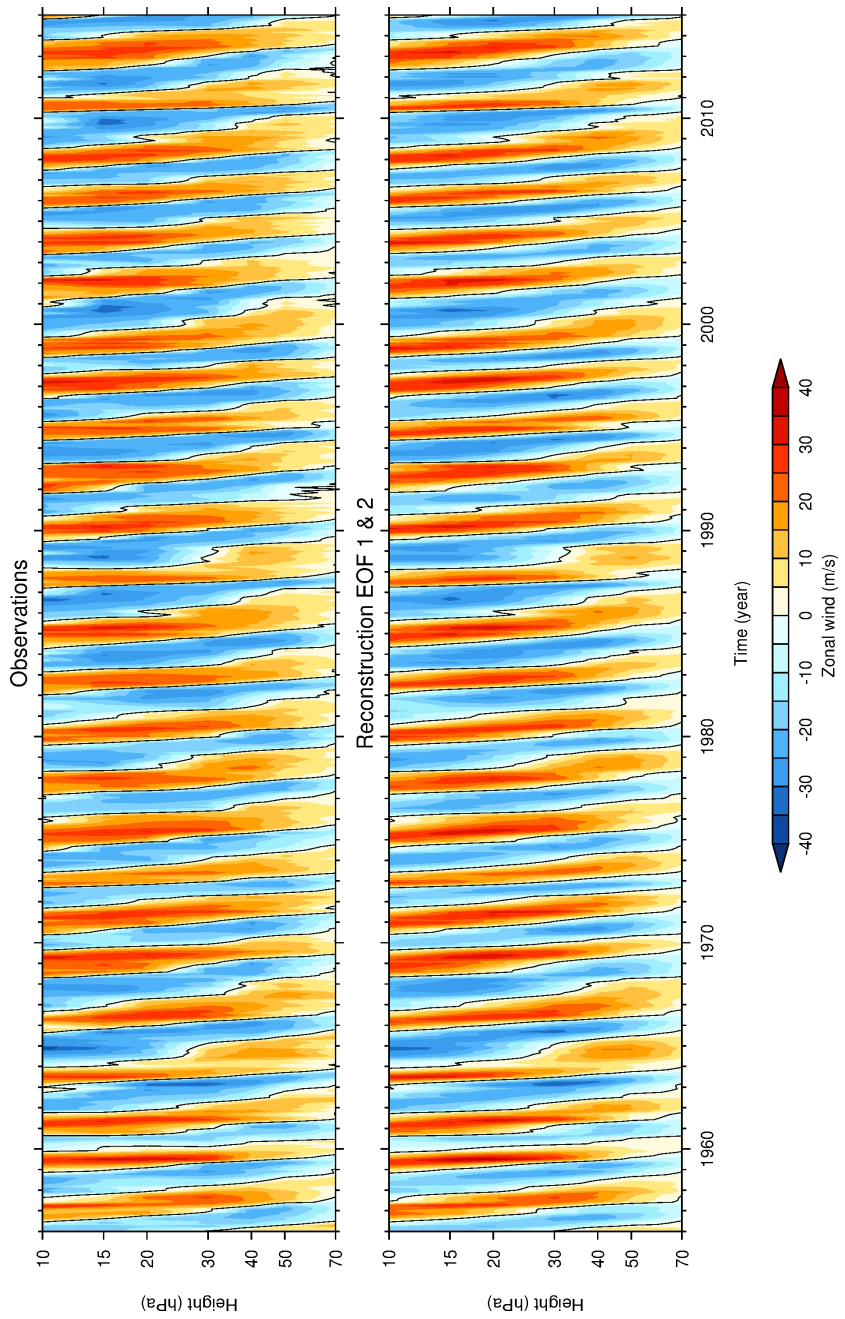

Figure S2. Height – time series of zonally-averaged equatorial zonal winds for the period 1958-2016 from the observed FUB winds (top panel) and reconstructed from the first two EOFs shown in figure S1 (bottom panel).

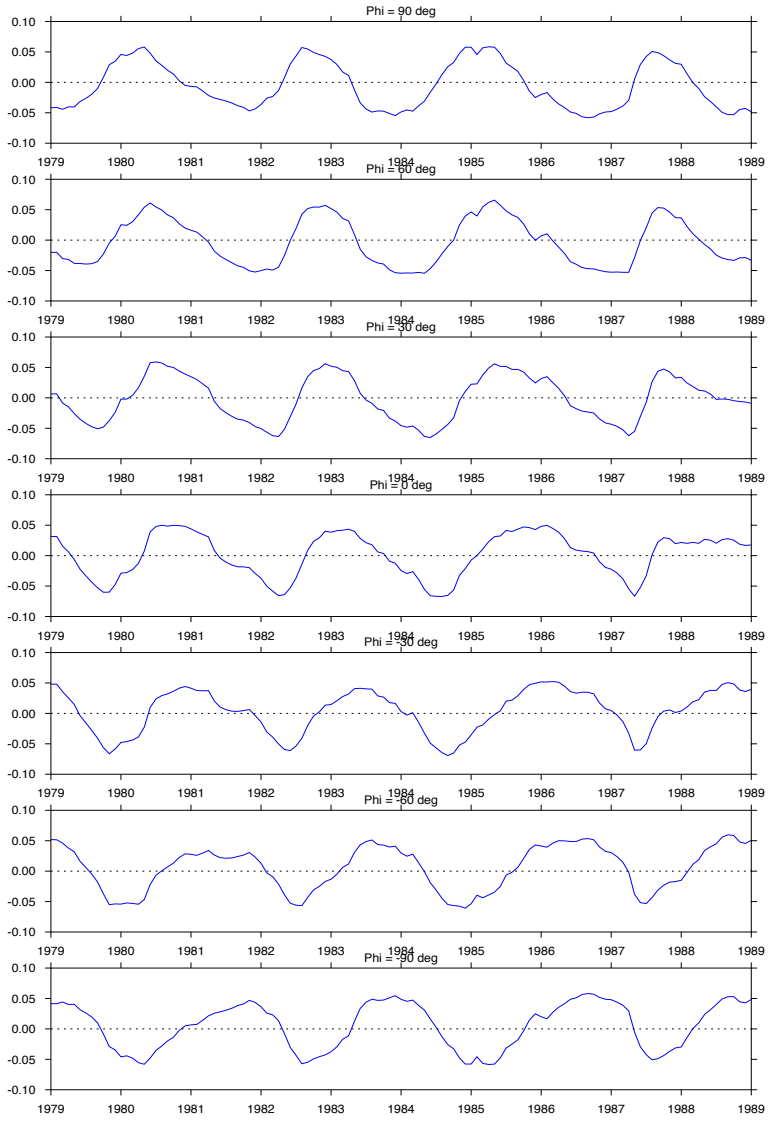

Figure S3: Sample time-series of equatorial wind anomalies (normalised) employed to characterise the QBO in the regression analysis using different values of ϕ from $\phi = +90^{o}$ (top panel) to $\phi = -90^{o}$ (bottom panel).

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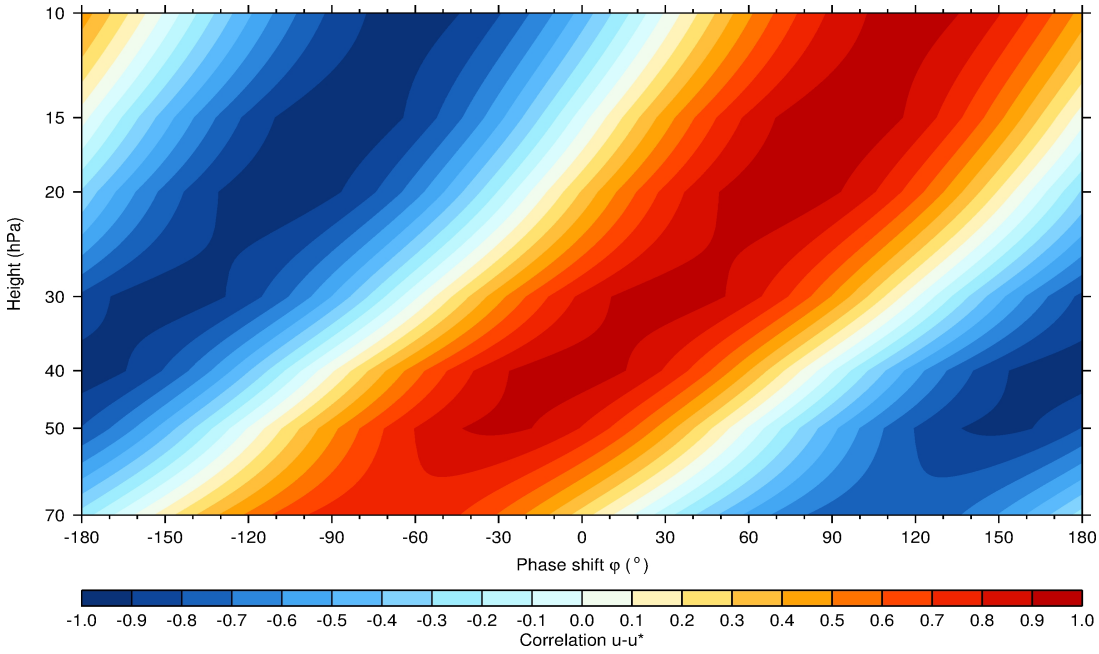

Figure S4: Diagram showing correlation coefficients between time-series (1958-2016) employed in the regression analyses based on the derived u* (see text) at different values of ϕ (abscissa) and based on the equatorial zonally-averaged zonal wind anomalies at heights between 10-70 hPa from the FUB dataset (ordinate).

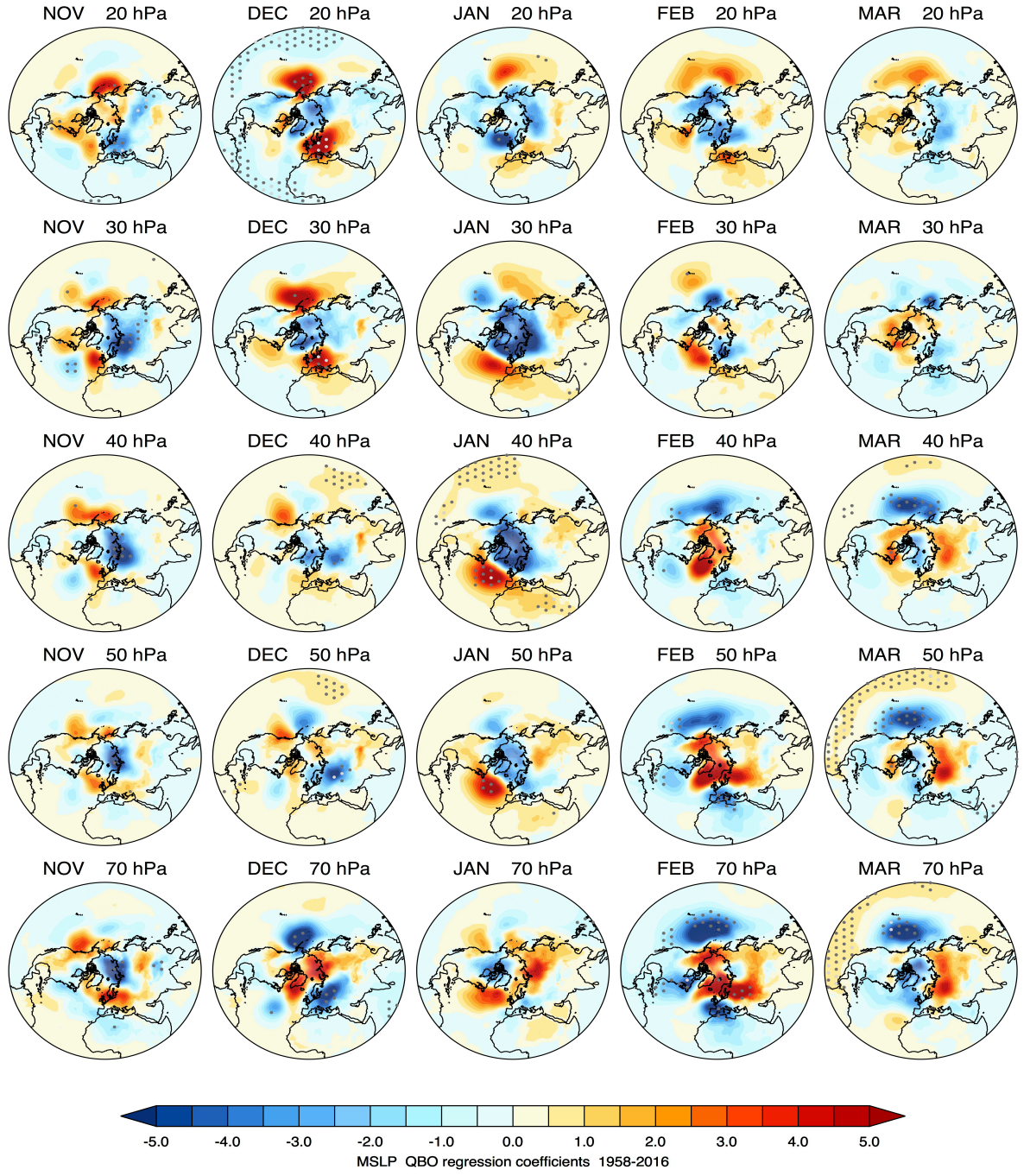

Figure S5: Regression based QBO-W minus QBO-E differences using FUB equatorial winds at levels from 20hPa (top row) to 70 hPa (bottom row): latitude-longitude distribution of mean sea level pressure (hPa) for November – March from the period 1958-2016. White (black) dots indicate 99% (95%) statistical significance.