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## Supplemental Material

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The Buffer Zone of the Quasi-Biennial Oscillation: Supplementary  
Information

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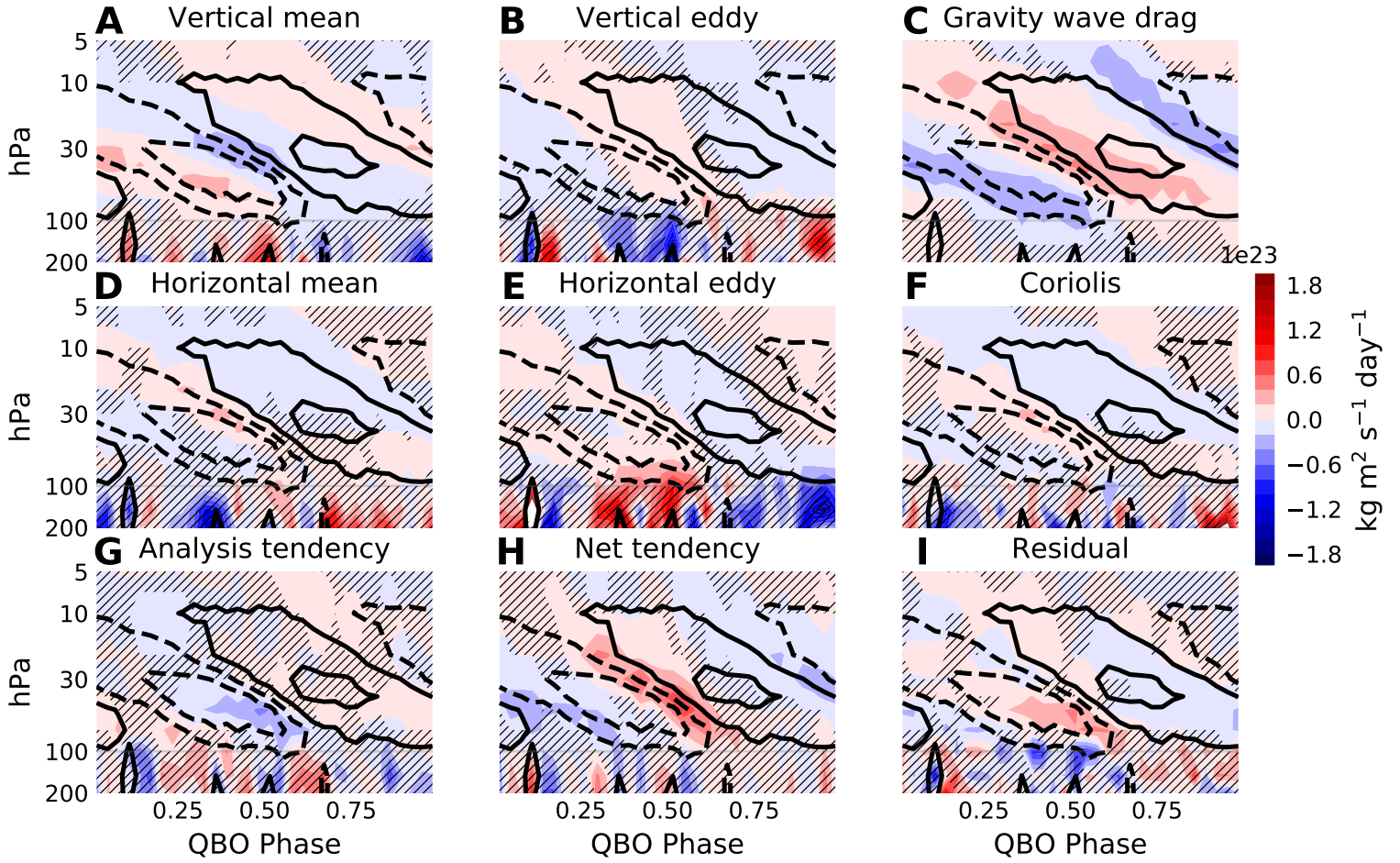


Figure 1: Composite of relative angular momentum tendencies with respect to QBO phase. QBO phase is calculated from the principal components of the two leading empirical orthogonal functions of stratospheric zonal wind following ?, and is composited across 32 bins. (Shaded) Time tendencies due to major terms in mass-weighted relative angular momentum budget. (Lines) Mass-weighted relative angular momentum contoured at  $[-9, -3, 3, 9] * 10^{23} \text{ kg m}^2 \text{ s}^{-1}$  (dashed = negative). Data is MERRA-2 averaged monthly, deseasonalized, and integrated from 10S-10N. Hatching is where the amplitude of the anomaly is less than one standard deviation within its phase bin.

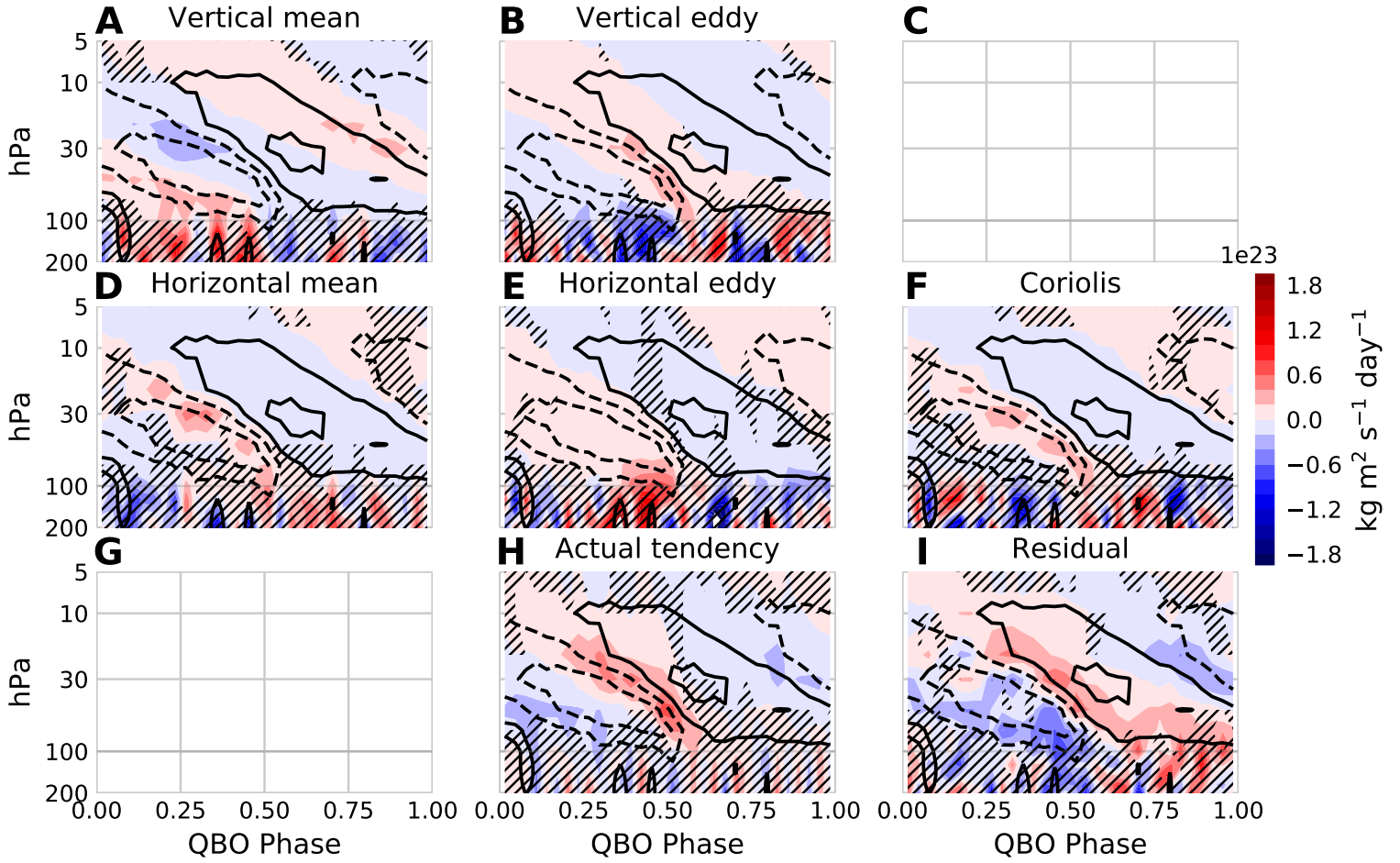


Figure 2: Composite of relative angular momentum tendencies with respect to QBO phase. QBO phase is calculated from the principal components of the two leading empirical orthogonal functions of stratospheric zonal wind following ?, and is composited across 32 bins. (Shaded) Time tendencies due to major terms in mass-weighted relative angular momentum budget. (Lines) Mass-weighted relative angular momentum contoured at  $[-9, -3, 3, 9] * 10^{23} \text{ kg m}^2 \text{ s}^{-1}$  (dashed = negative). Data is ERA-Interim averaged monthly, deseasonalized, and integrated from 10S-10N. Hatching is where the amplitude of the anomaly is less than one standard deviation within its phase bin.

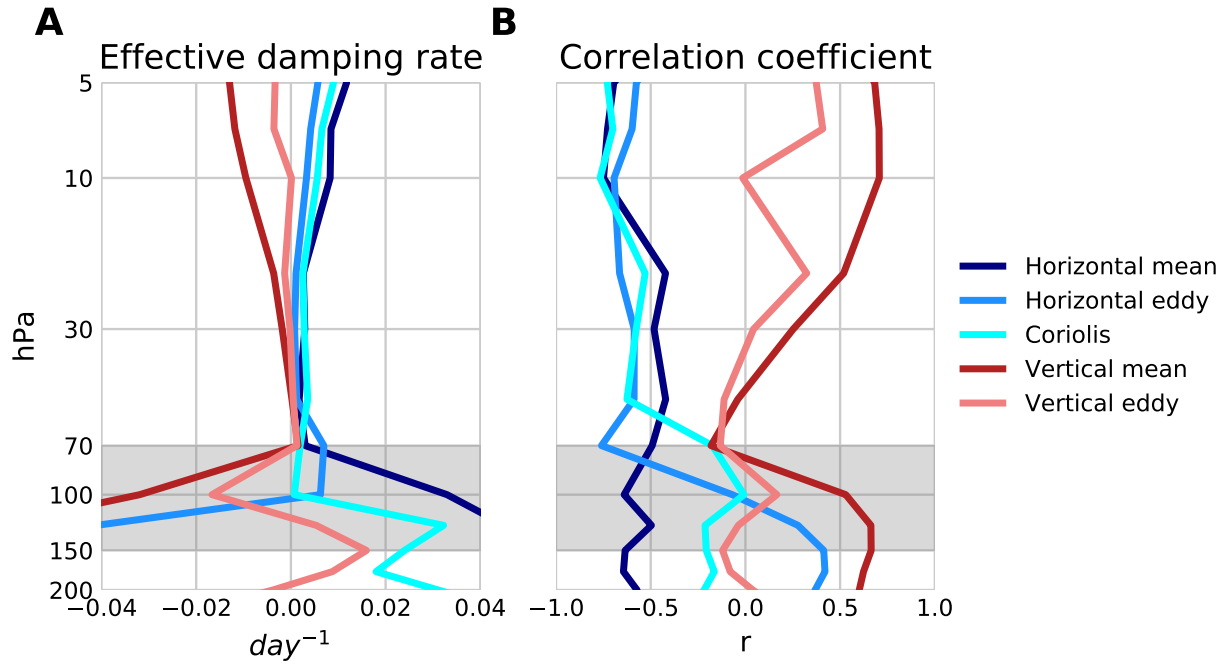


Figure 3: Effective damping rates of relative angular momentum anomalies in ERA-Interim. Integrated 10S-10N. Data from Jan 1979-Dec 2017.