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Dynamical forcing of sub-seasonal variability in the tropical Brewer-Dobson circulation

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Upwelling across the tropical tropopause exhibits strong sub-seasonal variability superimposed on the well-known annual cycle, and these variations directly affect temperature and tracers in the tropical lower stratosphere. The dynamical forcing of tropical upwelling on sub-seasonal timescales is investigated using the ERA-Interim reanalysis for 1979-2011. Momentum balance diagnostics reveal that transience is linked to the effects of extratropical wave forcing, with centers of action in the extratropical winter stratosphere and in the subtropical upper troposphere of both hemispheres. From a diagnostic point of view, the zonal-mean wind transient response is important for communicating the remote wave forcing to the tropical stratosphere. Dynamical patterns reflect distinctive forcing of the shallow versus deep branches of the Brewer-Dobson circulation.