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Bimodal behavior in the Northern Hemisphere's zonal-mean zonal flow and its possible association with decadal-scale coupled climate variability

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Examination of NCEP/NCAR reanalysis data indicates the presence, in the phase space of a few leading empirical orthogonal functions of the zonal wind, of two distinct, anomalously persistent flow patterns characterized by displacement of the mid-latitude jet stream north and south of its climatological position, respectively. The associated geopotential height anomalies are equivalent-barotropic and have a pronounced zonally symmetric component. Occupation frequency of either regime exhibits tantalizing decadal variability correlated, at multi-year lags, with the North Atlantic Ocean's sea-surface temperature anomalies, thus suggesting an active ocean-atmosphere coupling as a possible candidate for the dynamical origin of this behavior. These observational results are further rationalized using intermediate coupled climate models.