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Tropospheric and stratospheric wind contributions to Earth's variable rotation from NCEP/NCAR reanalyses

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The individual tropospheric and stratospheric wind contributions to the Earth's variable rotation during the period 2000-2005 are investigated to further our understanding of the role of wind in exciting polar motion and the variation of the Earth's rotational rate (or the length of day, LOD, change). Instead of the previous empirical approach, which simply assumed the tropopause as an equal-pressure level, the present study employs a tropopause, that is space- and time-dependent, and is from the National Centers for Environmental Prediction-National Center for Atmospheric Research (NCEP/NCAR) reanalyses. For the axial component, the tropospheric and stratospheric wind effects are essentially additive. For the equatorial components, however, a significant cancellation is found between the tropospheric and stratospheric wind terms based on the NCEP/NCAR reanalysis model.