



## **The influence of the quasi-biennial oscillation on isentropic transport and mixing in the tropics and subtropics**

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The influence of the quasi-biennial oscillation on isentropic transport and mixing in the tropical and subtropical stratosphere is investigated. The transport and mixing is quantified by the effective diffusivity diagnostic, calculated from tracers (i) simulated in chemical transport models using ECMWF analysed winds and (ii) taken from satellite observations (MLS ozone). A clear pattern of variations to the isentropic transport and mixing is observed which is seen to vary with altitude. For example, around 600K, when the QBO winds are easterly, mixing is inhibited in the tropics throughout the broad region occupied by the easterlies, whilst when the QBO winds are westerly, mixing is strongly inhibited within the narrow region occupied by the westerlies themselves, but is enhanced in the subtropics. Examination of zonal-mean quasi-geostrophic potential vorticity gradients and horizontal EP fluxes (broken down into contributions from different zonal wavenumbers) for this level suggests that, in the ECMWF analyses, barotropic shear instability of the westerly jet, as well as propagation of planetary waves from the extratropics, drives the subtropical mixing seen in the westerly phase.