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Interannual variability in effective diffusivity from ERA-Interim (1979-2012)

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The effective diffusivity based on tracer advection is used to evaluate the long-term mixing properties for the period 1979-2012 in the region 300 K - 800 K using data from the ERA-Interim reanalysis. The climatology is consistent with previous studies for shorter periods, featuring weak mixing in the tropical pipe, the subtropical jets and the core of the polar vortices, and enhanced mixing around the jets, in the surf zone and the summer lower stratosphere. The QBO dominates the variability in the tropics, with enhanced mixing in the summer hemisphere during the westerly phase. Consistently with previous studies, ENSO modifies the strength of mixing across the jets, and here it is also found to impact mixing in the subtropical austral summer lower stratosphere. Long-term trends suggest a weakening of mixing in the austral lower stratosphere, consistent with the strengthening of the SH polar vortex. A positive mixing trend is also found in the upper SH stratosphere, near the vortex core.