



The Interdecadal Pacific Oscillation and mid-stratospheric tropical ozone trends

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In recent years, the global ozone layer has started to show the first signs of recovery, but puzzlingly tropical mid-stratospheric ozone has decreased since the beginning of the 90s. This is a key region of the stratosphere where most ozone is produced. Previous studies have shown that interannual variability in the troposphere (e.g. El Niño-Southern Oscillation) can affect the lower stratosphere, both dynamics and composition. Here for the first time, we show how multidecadal internal climate variability – in the Pacific Ocean's sea surface temperatures (i.e. the Interdecadal Pacific Oscillation, IPO) – have an impact in mid-stratospheric tropical ozone, and account for the observed trends. We suggest a mechanism that involves dynamical (i.e. Brewer Dobson circulation) and chemical (i.e. ozone loss chemistry via NO_y chemistry) processes to explain this IPO-ozone link. Understanding internally generated multidecadal variability in this region of the stratosphere is crucial to distinguish between forced and unforced signals and better describe ozone recovery.