



Properties of the ex-TL derived from O₃, CO, H₂O, and acetone observations onboard the CARIBIC passenger aircraft (2005-2008)

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The extra-tropical tropopause (transition) layer (ex-TL) names a layer sandwiched at the lower border by the extra-tropical tropopause and at the upper border by the unperturbed lowermost stratosphere (LMS) not influenced by recent in-mixing of tropospheric air. The ex-TL is usually identified by tracer-correlations observed onboard aircraft. Many properties of the ex-TL such as its seasonal variation, its short-term variability or its spatial (in particular vertical and latitudinal) variation are badly quantified, yet. Likewise, its relation to the recently discovered and meteorologically defined tropopause inversion layer (TIL) is not known, yet.

A unique dataset collected during more than 100 flights onboard the CARIBIC passenger aircraft as of May 2005 contains a wealth of new information on the ex-TL between $\sim 100^{\circ}\text{W}$ and $\sim 100^{\circ}\text{E}$ and $\sim 35^{\circ}\text{N}$ and 60°N . Many trace species (here O₃, CO, H₂O and acetone are discussed) show a pronounced seasonal variation around the extra-tropical tropopause with partially surprisingly little short-term variability. For instance, acetone as a major precursor of OH around the tropopause varies by a factor of three between summer and winter. Moreover, the data clearly indicate the in-mixing of tropospheric air into the LMS in summer and its dispersion in the LMS until about November when the subsidence of clean O₃-rich air from higher altitude set in. The contribution will also try to elucidate the different information inferred from the different types of analyzed tracers.