Comparison of northern hemispheric and southern hemispheric Mean Age derived from in situ tracer measurements during POLSTRACC and SouthTRAC

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The mean age of air is a powerful diagnostic tool to investigate stratospheric transport processes. It can be derived from suitable trace gas measurements and from model calculations. In contrast to the Northern Hemisphere (NH), data coverage of in situ measurements of such trace gases in the Southern Hemisphere (SH) is sparse. Due to its tropospheric trend and its very long atmospheric lifetime, SF₆ is such a suitable trace gas. SF₆ mixing ratios were measured with an airborne in situ GC-ECD system during several HALO aircraft campaigns, including locations in the SH polar vortex.

Here we present the mean age derived from in situ SF₆ measurements during the POLSTRACC campaign (Polar Stratosphere in a Changing Climate) in NH winter/spring 2015/2016 and during the SouthTRAC campaign (Transport and Composition of the Southern Hemisphere UTLS) in SH winter/spring 2019. Mean age values over 4 years were observed in both polar vortices. On average, higher mean age values were observed at lower levels of potential temperature during SouthTRAC 2019 than during POLSTRACC 2015/2016. The findings will be discussed in context of the Brewer-Dobson circulation.