



Chemical tracers as indicators of transport time scales and source regions of air in the UTLS

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The UTLS is a complex mixture of air transported from a variety of different regions and over a wide range of time scales. This can make the interpretation of tracer distributions in the UTLS quite difficult. We present a method to use measurements of molecules with photolytic processing in the stratosphere to quantitatively estimate the stratospheric 'overworld' contribution to UTLS tracer gradients. With this information the 'age' tracers, such as CO₂ and SF₆, can reveal transport time scales and surface latitudinal origins of UTLS air. We demonstrate these techniques with observations from the START-08 and HIPPO aircraft campaigns, which are uniquely suited to this type of study. Implications of our results for modeling of important greenhouse gases in the troposphere will be discussed.