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Fractional release factors of long-lived halogenated organic compounds in the tropical stratosphere

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Abstract. Fractional release factors (FRFs) of organic trace gases are time-independent quantities that influence the calculation of Global Warming Potentials and Ozone Depletion Potentials. We present the first set of vertically resolved FRFs for 15 long-lived halocarbons in the tropical stratosphere up to 34 km altitude. They were calculated from measurements on air samples collected on board balloons and a high altitude aircraft. We compare the derived dependencies of FRFs on the mean stratospheric transit times (the so-called mean ages of air) with similarly derived FRFs originating from measurements at higher latitudes and find significant differences. Moreover a comparison with averaged FRFs currently used by the World Meteorological Organisation revealed the limitations of these measures due to their observed vertical and latitudinal variability. The presented data set could be used to improve future ozone level and climate projections.

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