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ClOOCl photolysis at high solar zenith angles: Analysis of RECONCILE self-match flight

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The ClO-dimer catalytic cycle is one of the key processes driving ozone loss in the polar winter/spring stratosphere. Some kinetic parameters controlling this cycle are still not unambiguously determined. In particular, there exists a large uncertainty in the ClOOCl absorption cross sections making it difficult to determine the rate of the ClO-dimer cycle under twilight conditions. To investigate this, a self-match flight was carried out, in which the high altitude aircraft Geophysica sampled the same air masses twice, during night and just after sunrise. Preliminary analysis of the ClO concentration increase measured during the flight shows reasonable agreement with theoretical calculations based on a number of different absorption spectra measured in the laboratory. However, based on our results, the spectrum published by Pope et al.(2007) can be ruled out, and the possibility of additional ClOOCl absorption bands longwards of 450 nm seems extremely unlikely.