



## Supplement of

## **Global cloud top height retrieval using SCIAMACHY limb spectra: model studies and first results**

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Figure S1: Modelled CIR as a function of CTH and sun zenith angle. The SAA is  $90^{\circ}$ .



## SCIAMACHY Nadir CTH [km] (all Flags) 2006

Figure S2: Nadir annual mean CTH and standard deviation.



Figure S3: Scatterplots of co-located cloud top heights from SCIAMACHY and MIPAS measurements for 4 months (Sarychev: July 2009, Background: April 2010, Nabro and PSC: September 2011, Nabro: November 2011).



Figure S4: Mean CTH of MIPAS (different algorithms) and SAGE II climatology (grey line) taken from Spang (2012) superimposed with SCIAMACHY mean CTH (red dashed line) for 6 to 28km of 2003. The dashed blue line shows the annual zonal mean taking all CTH into account.





Figure S5: Time series of height resolved monthly zonal mean CIR and standard deviation for 2 latitude bands (30-70N and 30-70S) showing the decrease of CIR and SD for the major volcano events after 2008. In the southern hemisphere we can also identify a small CIR reduction due to the Puyehue volcano.