

Figure 3: Profiles for forward (FW) and backward (BW) spectra with covariance plus smoothing error of H<sub>2</sub>O and O<sub>3</sub> for profile 87, flight L5. The a priori standard deviation is shown in gray (not changed, included for legend).

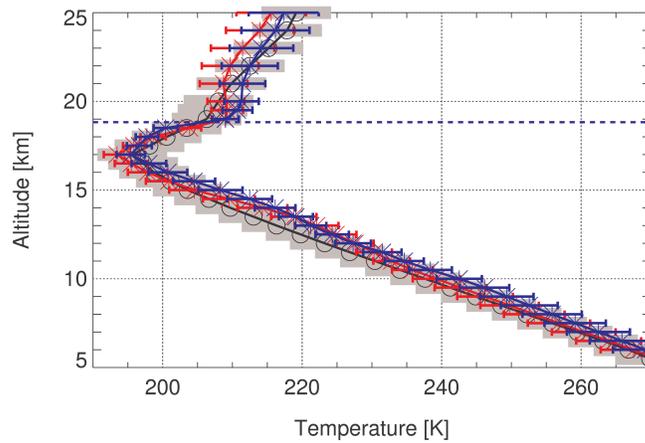


Figure 3: (c) Profiles for forward (FW) and backward (BW) spectra with covariance plus smoothing error of temperature for profile 87, flight L5. The a priori standard deviation is shown in gray (legend see Fig. 3a).

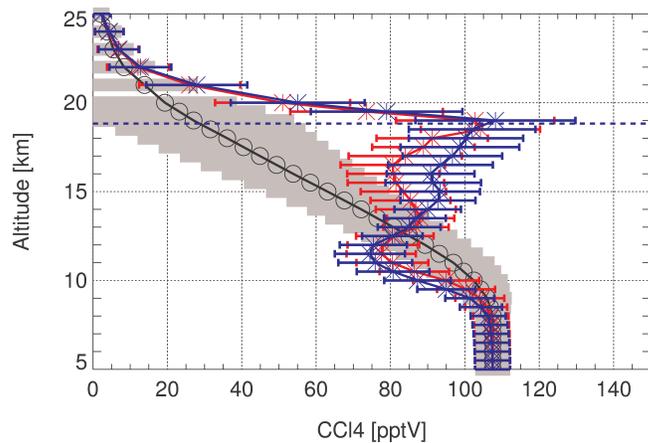


Figure 3: (d) Profiles for forward (FW) and backward (BW) spectra with covariance plus smoothing error of  $\text{CCl}_4$  for profile 87, flight L5. The a priori standard deviation is shown in gray (legend see Fig. 3a).

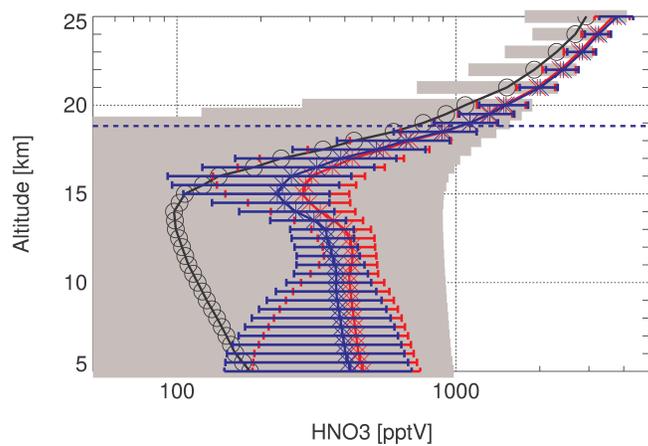


Figure 3: (e) Profiles for forward (FW) and backward (BW) spectra with covariance plus smoothing error of  $\text{HNO}_3$  for profile 87, flight L5. The a priori standard deviation is shown in gray (legend see Fig. 3a).

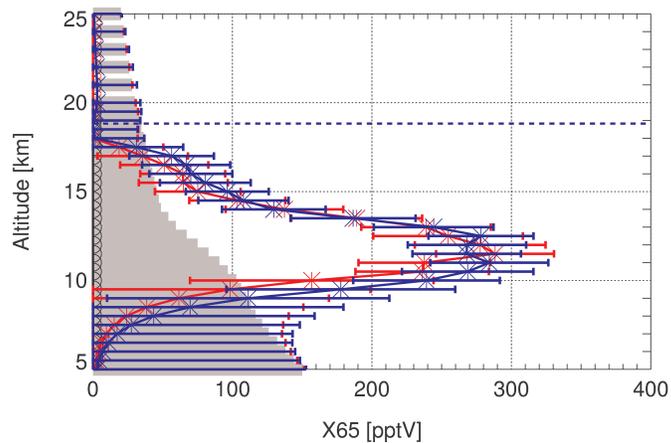


Figure 3: (f) Profiles for forward (FW) and backward (BW) spectra with covariance plus smoothing error of PAN for profile 87, flight L5. The a priori standard deviation is shown in gray (legend see Fig. 3a).

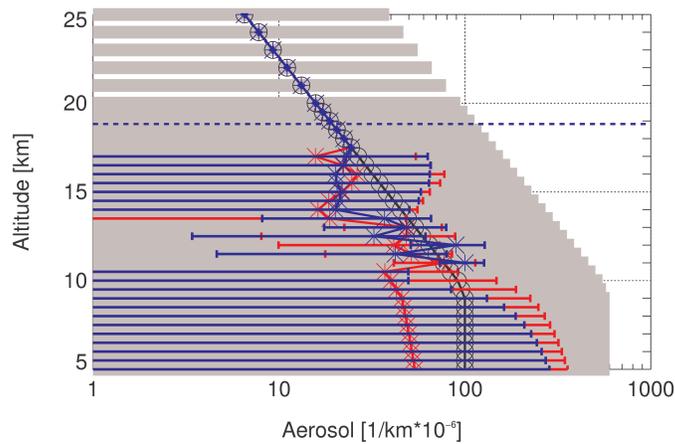


Figure 3: (g) Profiles for forward (FW) and backward (BW) spectra with covariance plus smoothing error of aerosol for profile 87, flight L5. The a priori standard deviation is shown in gray (legend see Fig. 3a).

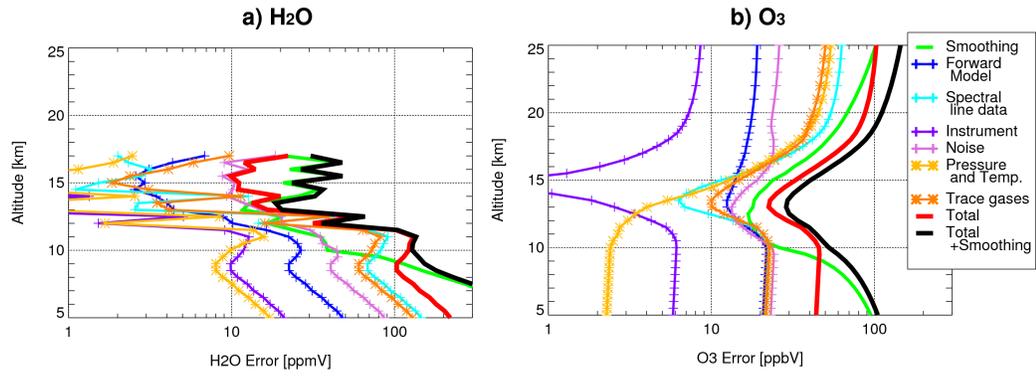


Figure 4: Error components for H<sub>2</sub>O and O<sub>3</sub> for profile 87 (forward spectra), flight L5 (not changed, included for legend).

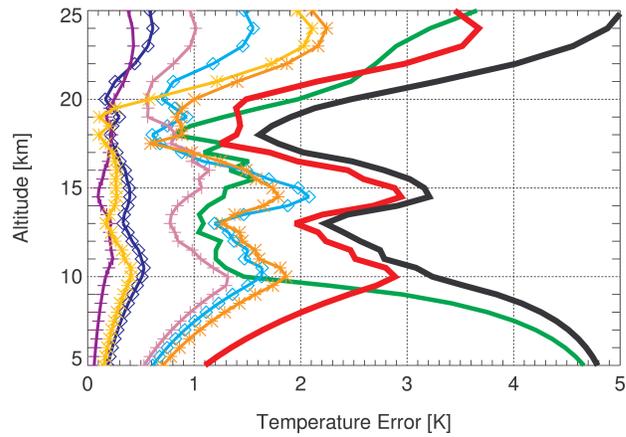


Figure 5: (c) Error components for temperature for profile 87 (forward spectra), flight L5 (legend see Fig. 4b).

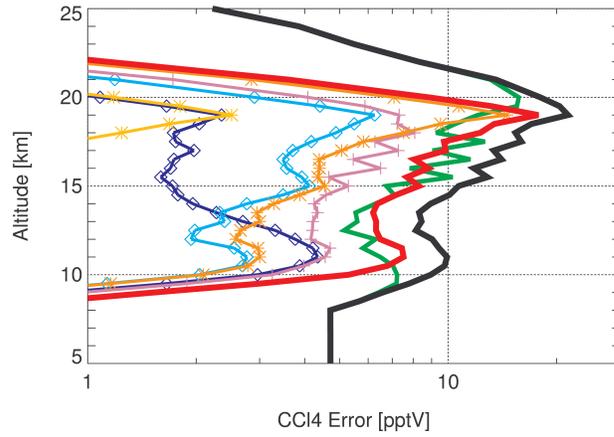


Figure 4: (d) Error components  $\text{CCl}_4$  for profile 87 (forward spectra), flight L5 (legend see Fig. 4b).

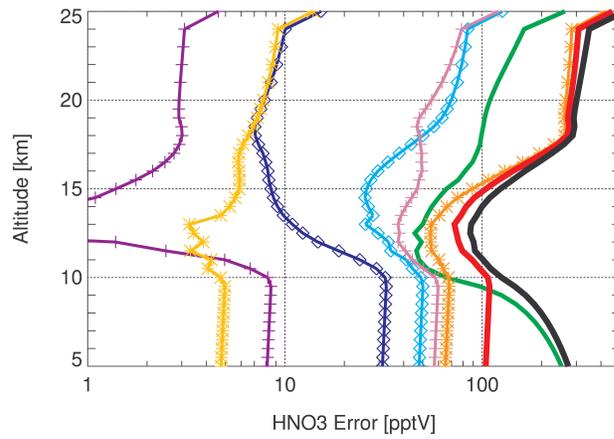


Figure 4: (e) Error components  $\text{HNO}_3$  for profile 87 (forward spectra), flight L5 (legend see Fig. 4b).

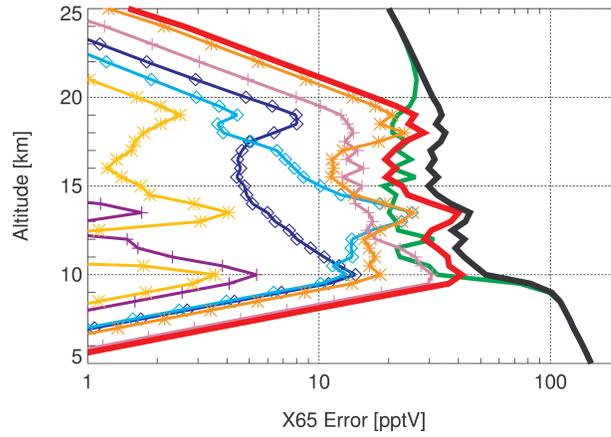


Figure 4: (f) Error components PAN for profile 87 (forward spectra), flight L5 (legend see Fig. 4b).

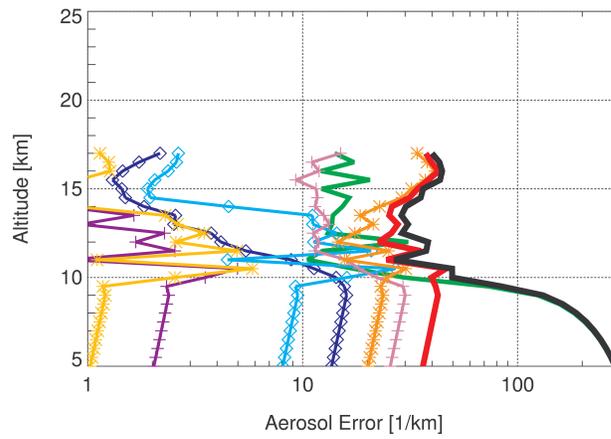


Figure 4: (g) Error components aerosol for profile 87 (forward spectra), flight L5 (legend see Fig. 4b).

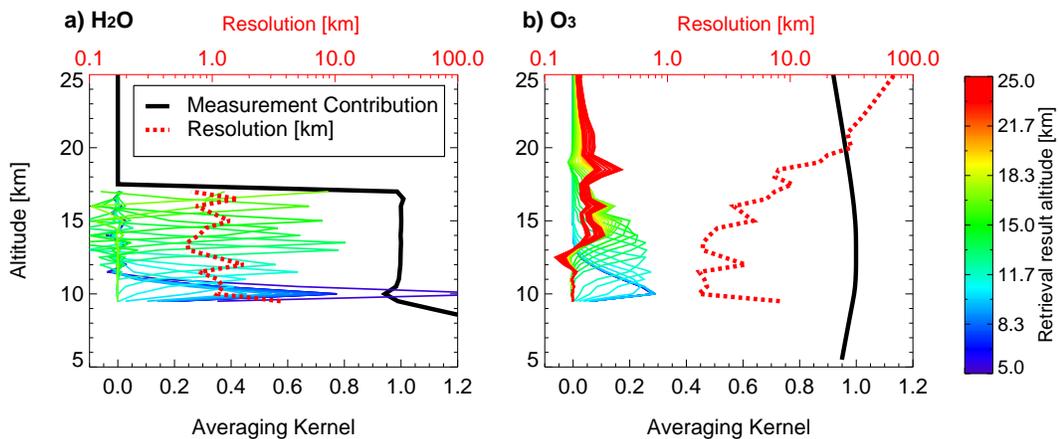


Figure 5: Averaging kernel matrix, measurement contribution and resolution for  $\text{H}_2\text{O}$  and  $\text{O}_3$  for profile 87 (forward spectra), flight L5 (not changed included for legend).

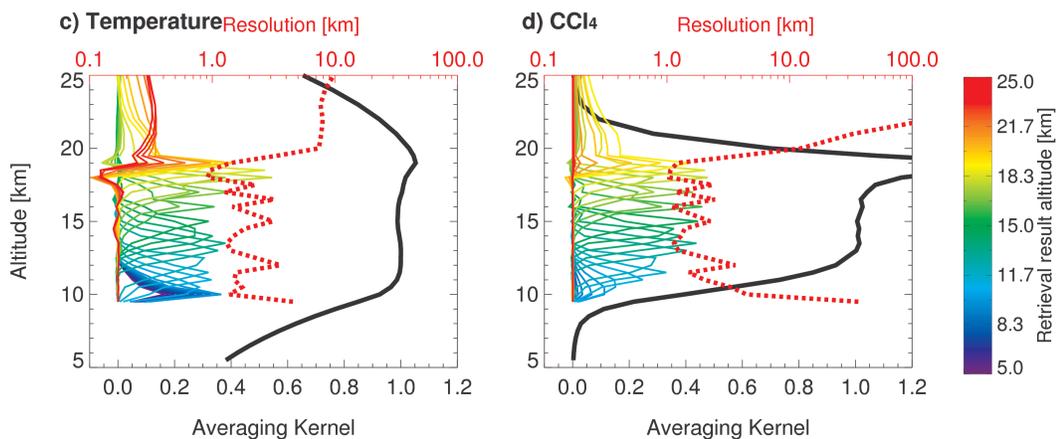


Figure 5: (c,d) Averaging kernel matrix, measurement contribution and resolution for temperature and  $\text{CCl}_4$  for profile 87 (forward spectra), flight L5 (legend see Fig. 5a).

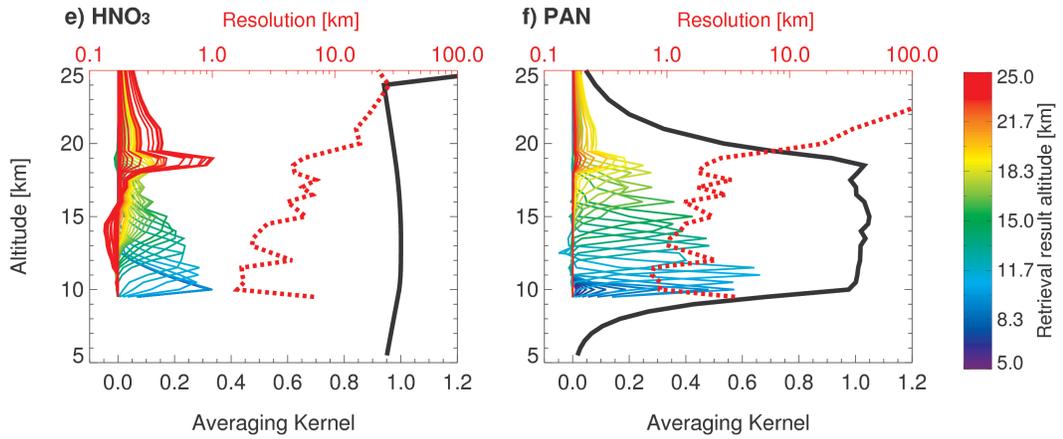


Figure 5: (e,f) Averaging kernel matrix, measurement contribution and resolution for  $\text{HNO}_3$  and PAN for profile 87 (forward spectra), flight L5 (legend see Fig. 5a).

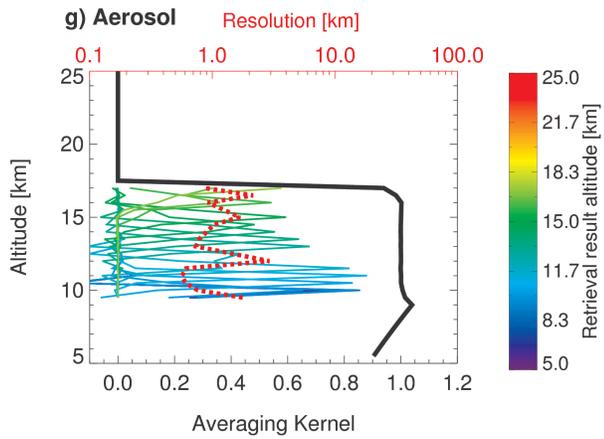


Figure 5: (g) Averaging kernel matrix, measurement contribution and resolution for aerosol for profile 87 (forward spectra), flight L5 (legend see Fig. 5a).

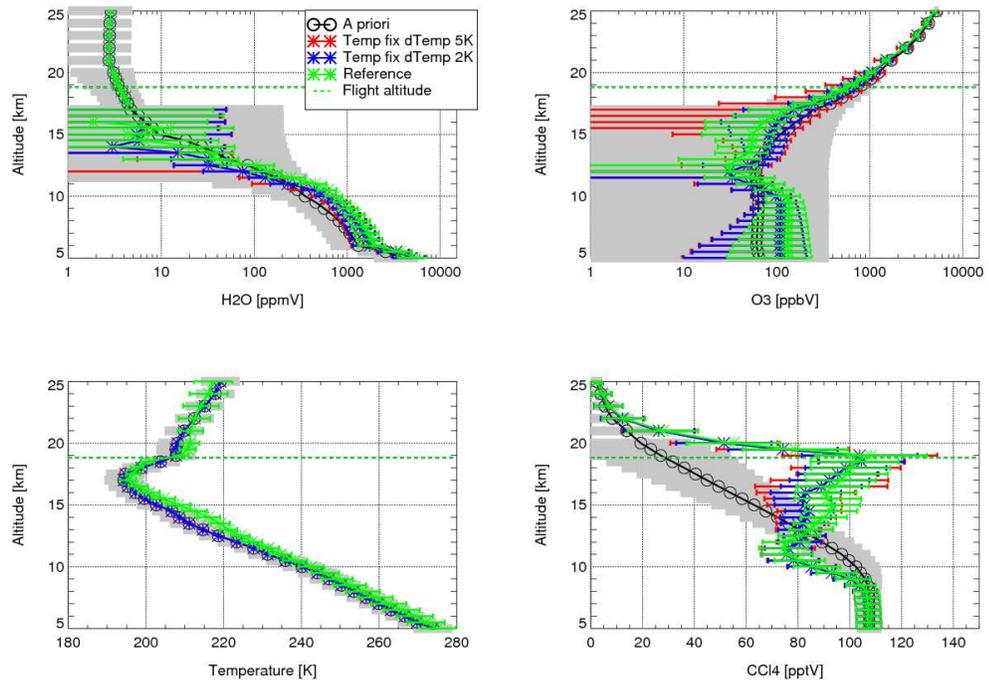


Figure 16: Retrieval result for H<sub>2</sub>O, O<sub>3</sub> and CCl<sub>4</sub> if the temperature is set to the average in situ value (with 5K and 2K error) below the flight altitude and the temperature retrieval is not run compared with the retrieval from the manuscript for forward spectra for profile 87.

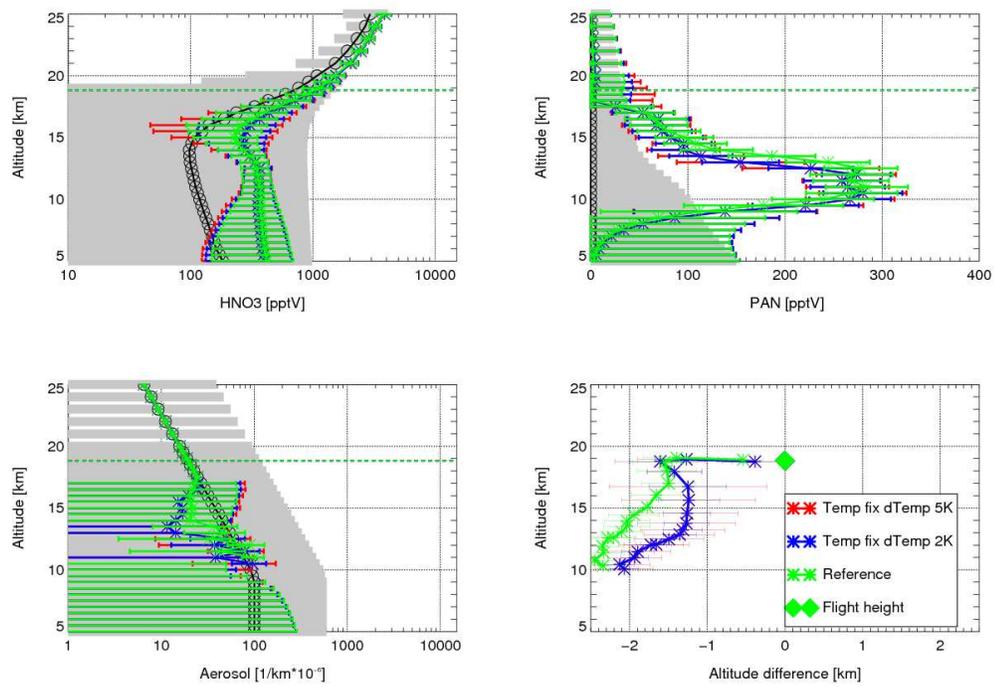


Figure 16: (continued) Retrieval result for HNO<sub>3</sub>, PAN aerosol extinction and view point altitude if the temperature is set to the average in situ value (with 5K and 2K error) below the flight altitude and the temperature retrieval is not run compared with the retrieval from the manuscript for forward spectra for profile 87.