**Atmospheric
Measurement
Techniques
Discussions**

Interactive
Comment

Interactive comment on "Aerosol information content analysis of multi-angle high spectral resolution measurements and its benefit for high accuracy greenhouse gas retrievals" *by* C. Frankenberg et al.

C. Frankenberg et al.

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We are very grateful for this positive review.

Some responses: 1) We have added a figure showing the phase function (and scattering angles) 2) "P2866 line 8: The authors use the O2A band and weak CO2/CH4 as 2-band. If they use the O2A and the strong CO2 as 2-band, is there signiïňĄcant difference between 2- band and 3-band?" –> We haven't analyzed this yet. If you only

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have 2 bands, the combination of strong CO2 band and O2 A-band is certainly favorable. However, the strong CO2 band has much lower surface albedos, esp. over dense vegetation and also snow. In general, SNR in the strong band wil thus always be lower than at 1.6 micron (also because of detectors and lower incoming solar radiation). Thus, this is a very complicated tradeoff which needs studies beyond ours. 3) spectroscopy and airmass: We added the following: (because line-wing effects get more important if absorption lines saturate in the core)

Many thanks for your suggestion to use real GOSAT data. 20 degrees off-axis pointing at a particular site would already help, so it would be great if this could be achieved as a test case. However, we will also need to implement the full retrieval of the concept shown in this manuscript.

minus sign in imaginary part was a typo. Higher variance in the prior needed to account for strongly absorbing types. tau is explained now (AOD, now specified at each wavelength)

Sincerely, Christian

Interactive comment on Atmos. Meas. Tech. Discuss., 5, 2857, 2012.