

**First Results from SCIAMACHY Channel 8 :**

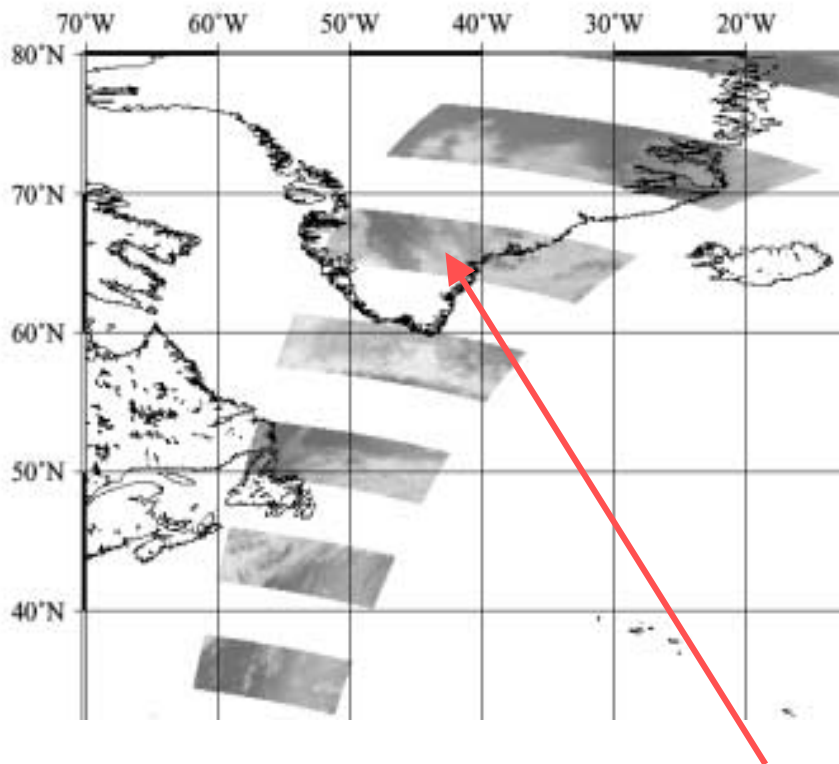
**Retrieval of Greenhouse Gases**

**A. N. Maurellis, H. Schrijver, I. Aben**

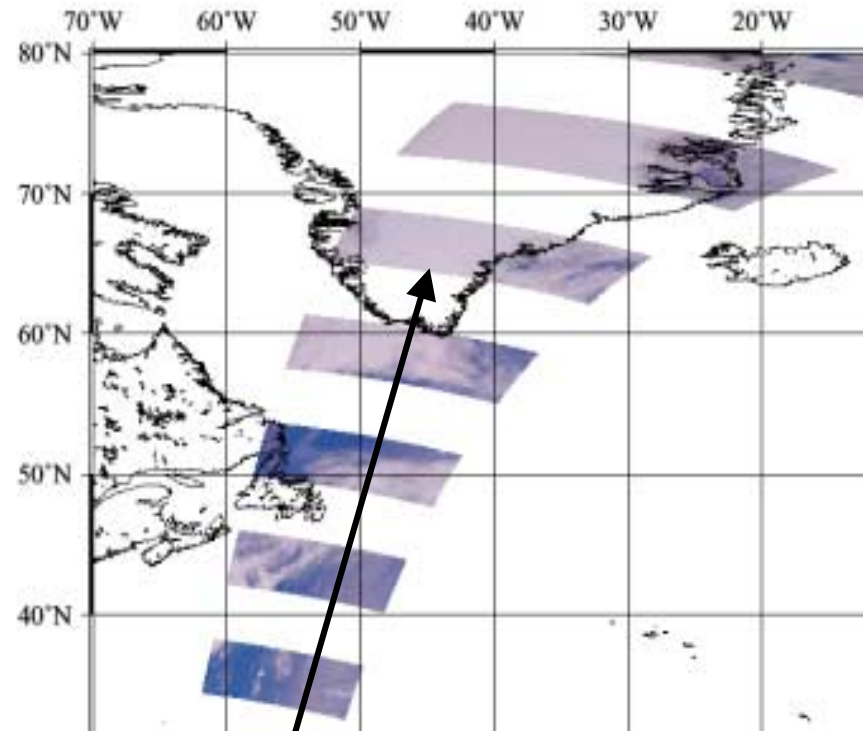
**SRON National Institute for Space Research**

# PMD : First Identification of Clouds over Ice

Near-Infrared PMD 6



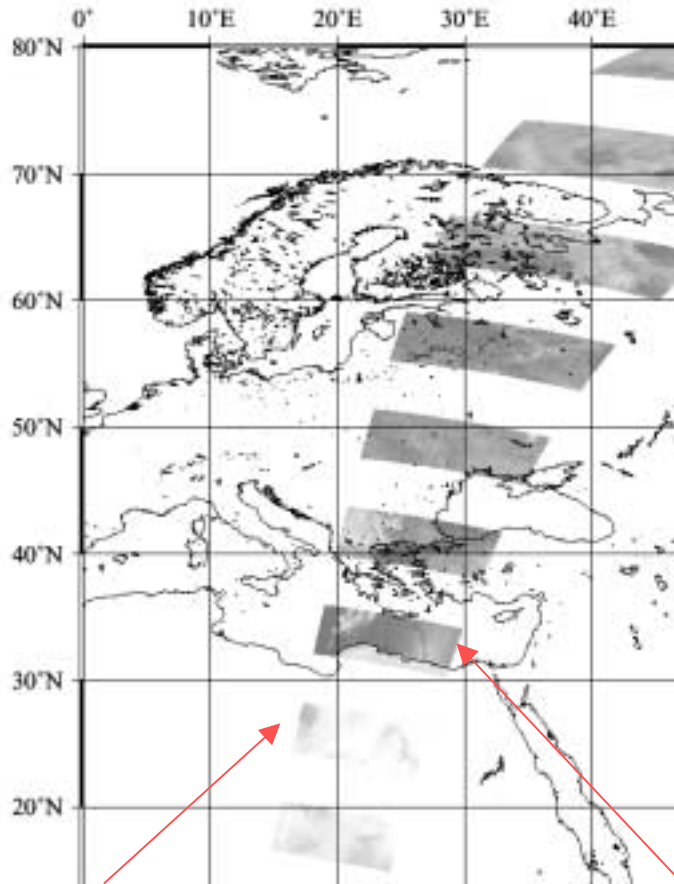
RGB composite, PMD 1-3 (visible)



Clouds with high albedo in the infrared may be easily distinguished from low-infrared albedo snow and ice, which is not the case in the visible

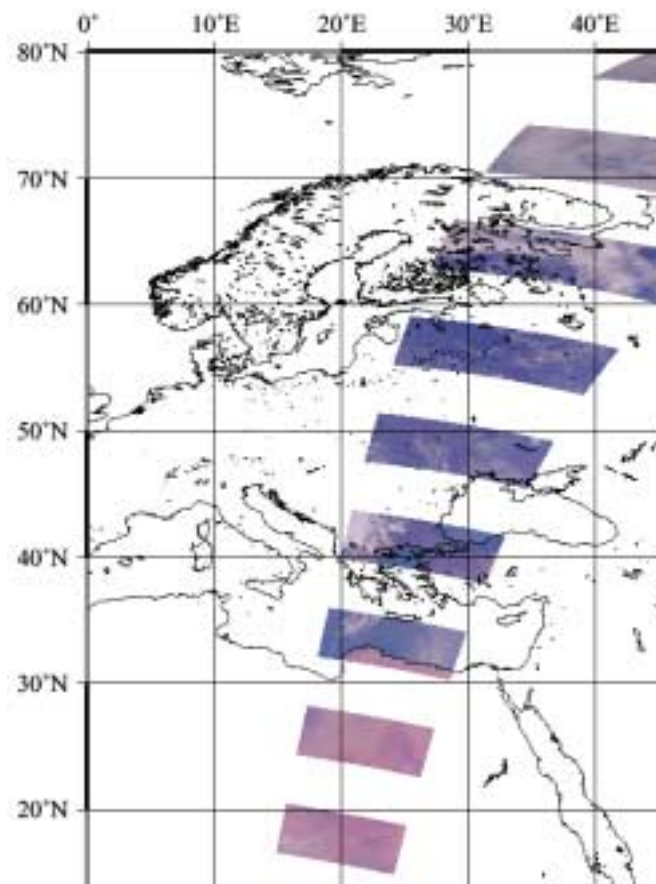
# PMD : Near-Infrared vs RGB

Near-Infrared PMD 6



High Near-Infrared Albedo

RGB composite, PMDS 1-3 (visible)



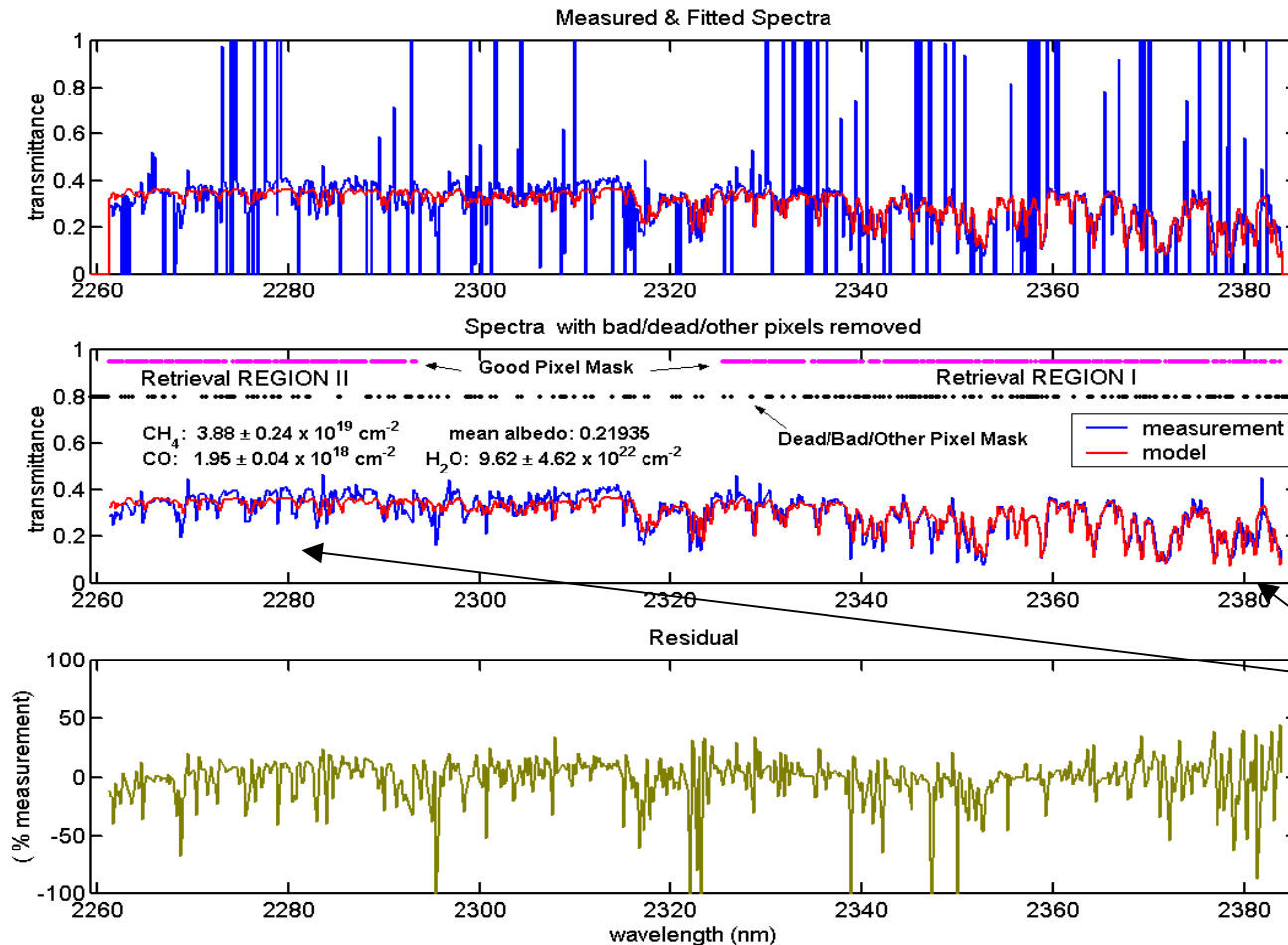
Low Near-Infrared Albedo,  
(mixed with high-albedo clouds)

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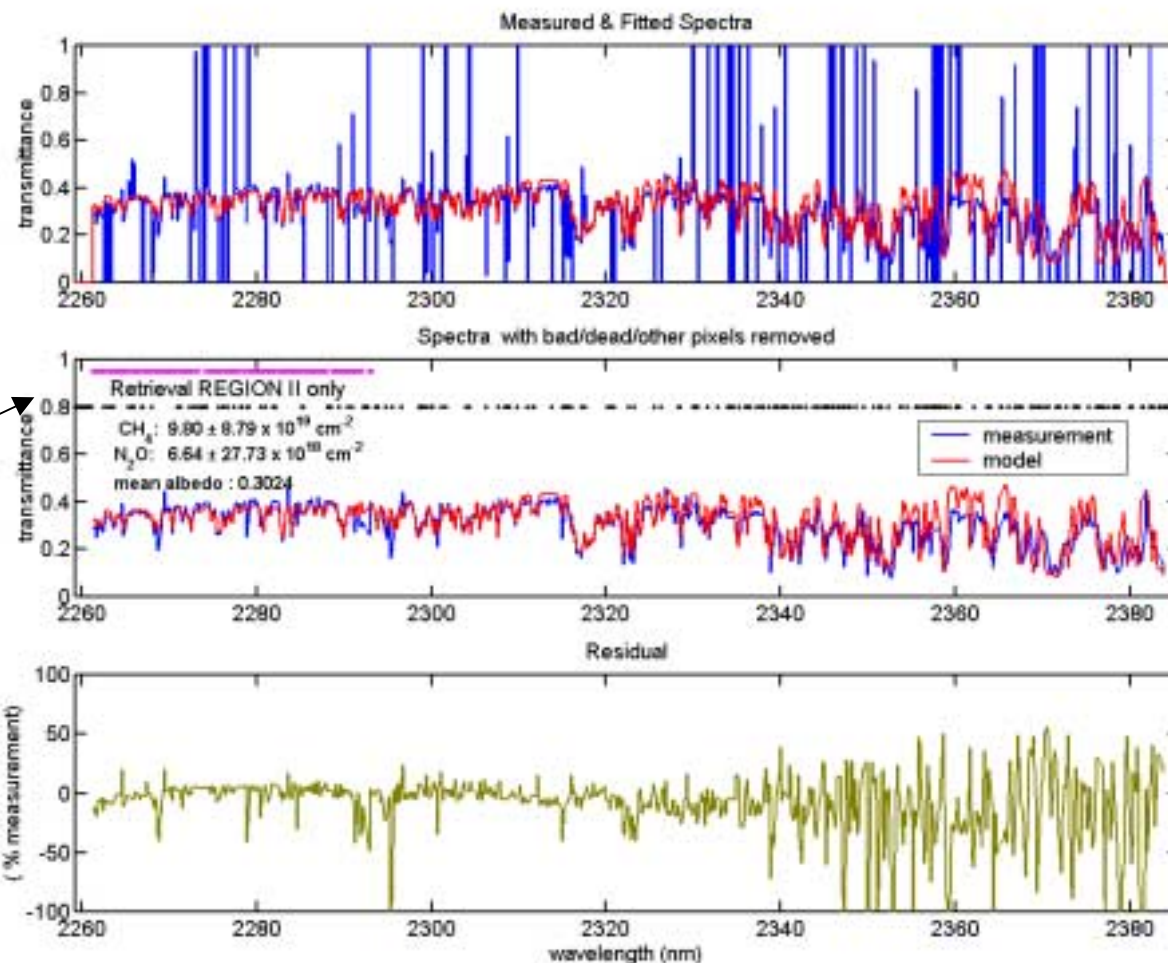
**Net Channel 8  
transmission  
reduced by 20 %**

# First Channel 8 Greenhouse Gas Spectral Fits – High Albedo Case



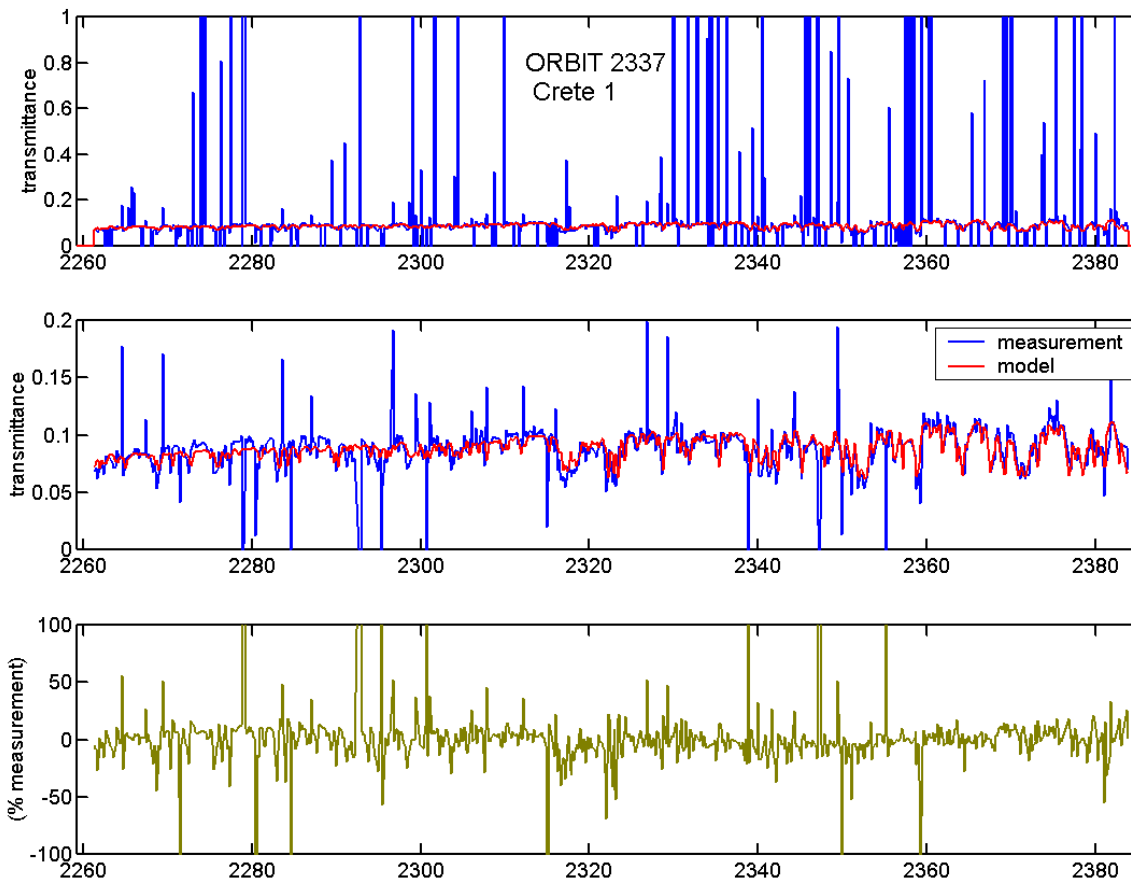
Impossible to fit both regions of the spectrum simultaneously – here region I fits best if pixel shift of two pixels is introduced

# First Channel 8 Greenhouse Gas Spectral Fits – High Albedo Case



Separate Region II fit works well without pixel shift

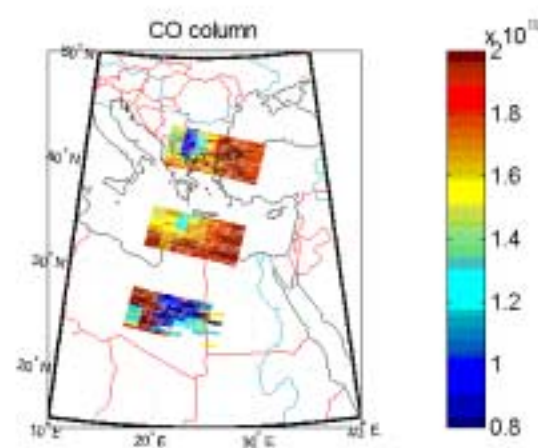
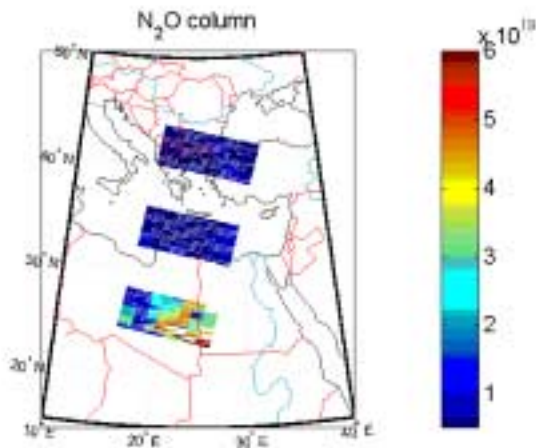
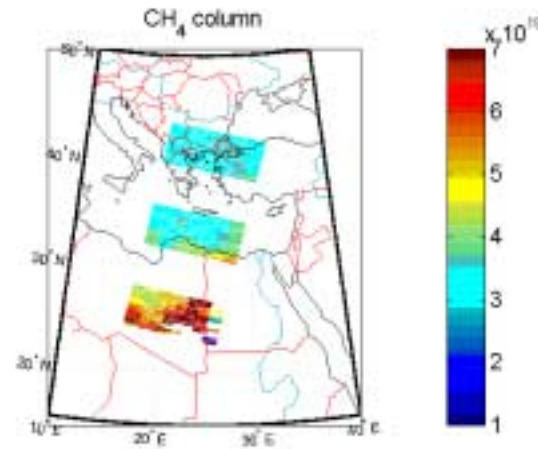
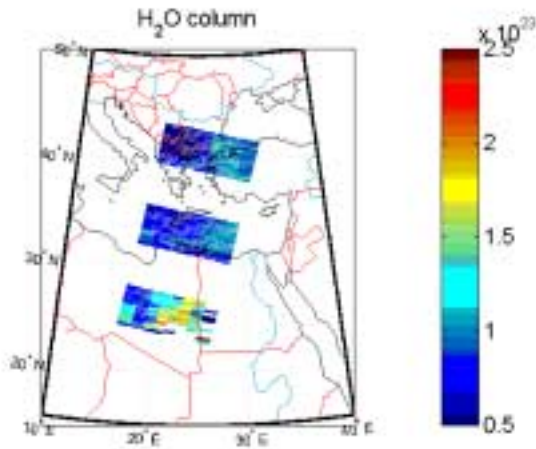
# First Channel 8 Greenhouse Gas Spectral Fits – Low Albedo Case



Considerably lower albedo highlights the need for removal of even more “bad” pixels



# First Channel 8 Greenhouse Gas Retrievals – Columns

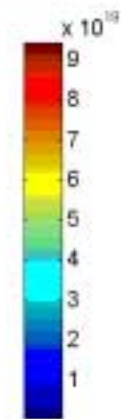
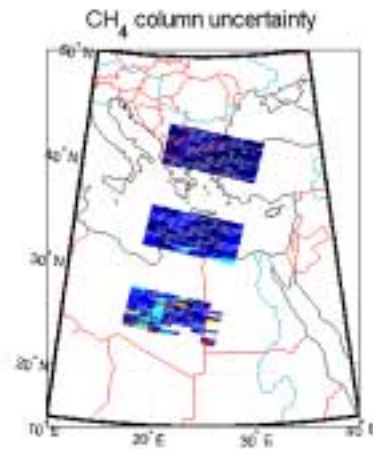
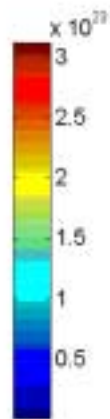
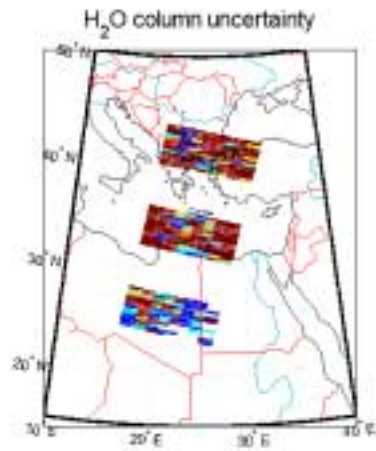


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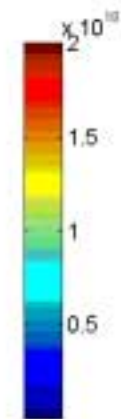
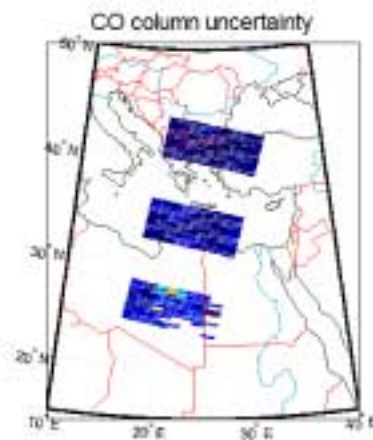
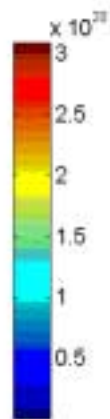
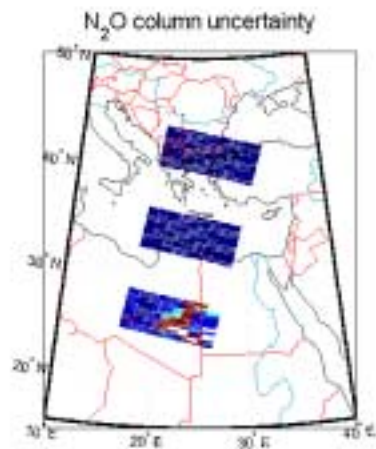
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# First Channel 8 Greenhouse Gas Retrievals – Col. Uncertainties



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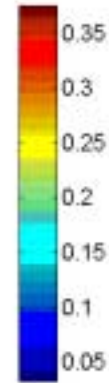
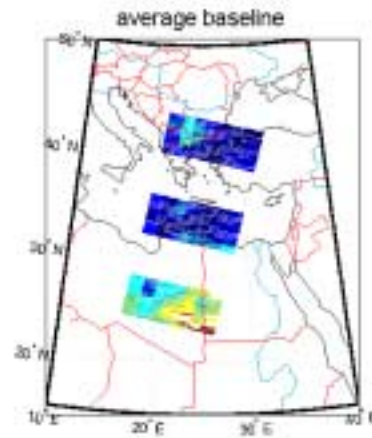
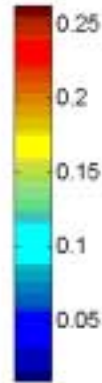
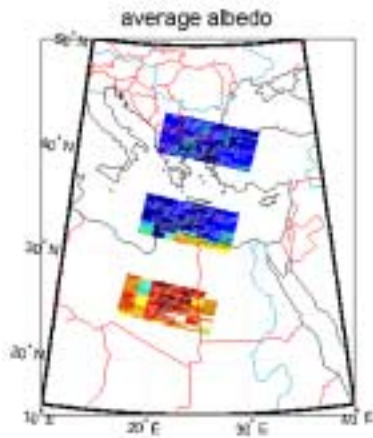
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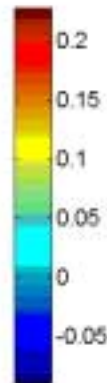
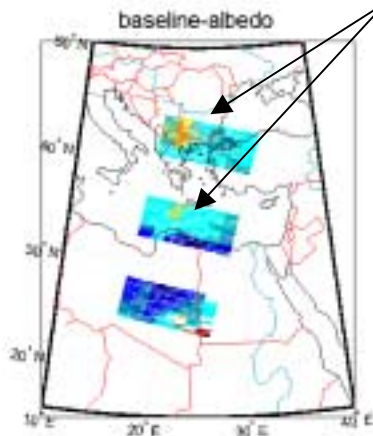


# First Channel 8 Greenhouse Gas Retrievals – Albedo & DFS

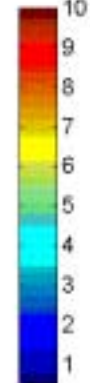
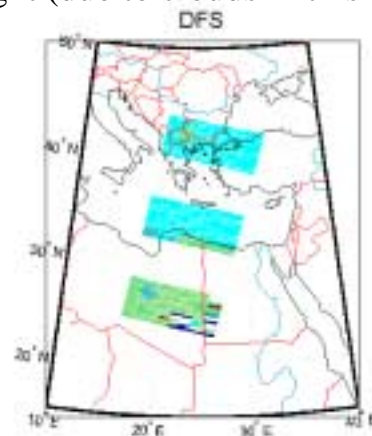


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Mean scatterer height (due to clouds in this case) detectable in difference signal



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# Conclusions: Channel 8 Retrievals

- Regions I and II have wavelength calibration problems which can be partially solved using table 2 in SRON calibration results (Schrijver 2000, SRON-EOS-HS-00001). There still appears to be a 3 pixel shift required in the long wavelength region of the channel.
- The dead/bad pixel map requires extensive updating - spectral model fits which show a very poor match to the measurements in some cases where the dark current pixel rejection threshold has not been set low enough (Kleipool 2002, SCIAMACHY Calibration Objective 37, in preparation)
- Reasonable columns (and, in some cases precisions) may be derived from the measured spectrum in discontinuous microwindows chosen from approximately 500 of the 1024 detector pixels (Maurellis *et al.*, 2002 Retrieval Simulations for SCIAMACHY Channel 8, in preparation)
- Spectroscopy might be wrong in region II (note: this is the region with the water vapor continuum effect and a region which also requires a CH<sub>4</sub> line update)
- Effects of thermal background changes and transmission changes because of ice development need to be modeled to determine how performance can be optimized