MIPAS Projects at RAL
Remote Sensing Group

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W.J. Reburn, V.Jay, R.Siddans, B.J.Kerridge, B. Latter,
Rutherford Appleton Laboratory, UK.

- Envisat Calibration / Validation Activities
  - Planned Tasks
  - Available Tools
  - Data Requirements

- AMIL2DA
  - RAL Processor
  - Retrieval Simulations
  - Next Steps

Project Summary

Inter-comparison of MIPAS and SCIAMACHY

Measurements and retrieved products from MIPAS and SCIAMACHY will be validated by systematic intercomparisons.

Proposed tasks are comparison of:

- MIPAS calibrated spectra with forward modeled spectra in H_2O and O_3 microwindows
- MIPAS O_3 profiles with GOME height resolved O_3 retrieved by RAL
- MIPAS L2 products to profiles retrieved by RAL and other institutes
- Spatially-averaged AATSR reflectances with spectrally-averaged SCIAMACHY nadir reflectances
- SCIAMACHY height-resolved O_3 with RAL's GOME retrieval
- SCIAMACHY height-resolved O_3 with O_3 retrieved by RAL's GOME scheme from SCIAMACHY measurements.

Tools Available

- GOME

  – GOME height resolved O_3 retrieval scheme

  – GOME-specific ATSR-2 cloud retrieval scheme

    (Both to be adapted to comparable SCIA operation)

- MIPAS H_2O and O_3 retrieval schemes

Data Requirements

- In order to gain insight into the performances of MIPAS and SCIAMACHY instruments and operational processing algorithms for ACVT, L1B and L2, products are requested from MIPAS, SCIAMACHY, AATSR and GOME for the same three, complete days, approximately one month apart, e.g.

  – 1. near start of Cal/Val phase
  – 2. ~ 1 month later
  – 3. ~ 2 months later

- The second and third days should ideally coincide with intensive deployment of ozonesondes.

Data Requirements (cont.)

- The following products are requested:
    - MIPAS: MIP_NL_1P, MIP_NL_2P, L1B& L2 Aux data (for all M_RP and M_GEO_1 measurements).
    - SCIAMACHY: SCI_NL_1P, SCI_NL_2P & Aux data
    - AATSR: ATS_TOA_1P
    - GOME: Level 1 NRT data for the same days
    - UK Met Office temperature and humidity analyses.These will be accessed via the BADC at RAL (i.e. independently of ESA)
    - Ozonesondes for the three days are also required.These will be acquired independently of ESA, if necessary.

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Project Aims

- Demonstrate retrieval in UTLS (primarily O_3 and H_2O)
- Pre-cursor to larger-scale processing scheme

- Retrieval Configuration
  - Retrieval Parameters
    - O_3 and H_2O profiles as primary targets
    - CO_2 N_2O CH_4 NO_2 HNO_3 also now included in state vector
    - 2 continuum absorption coefficient profiles per microwindow
    - 1 offset per microwindow (altitude independent)
  - Spectral Contaminants
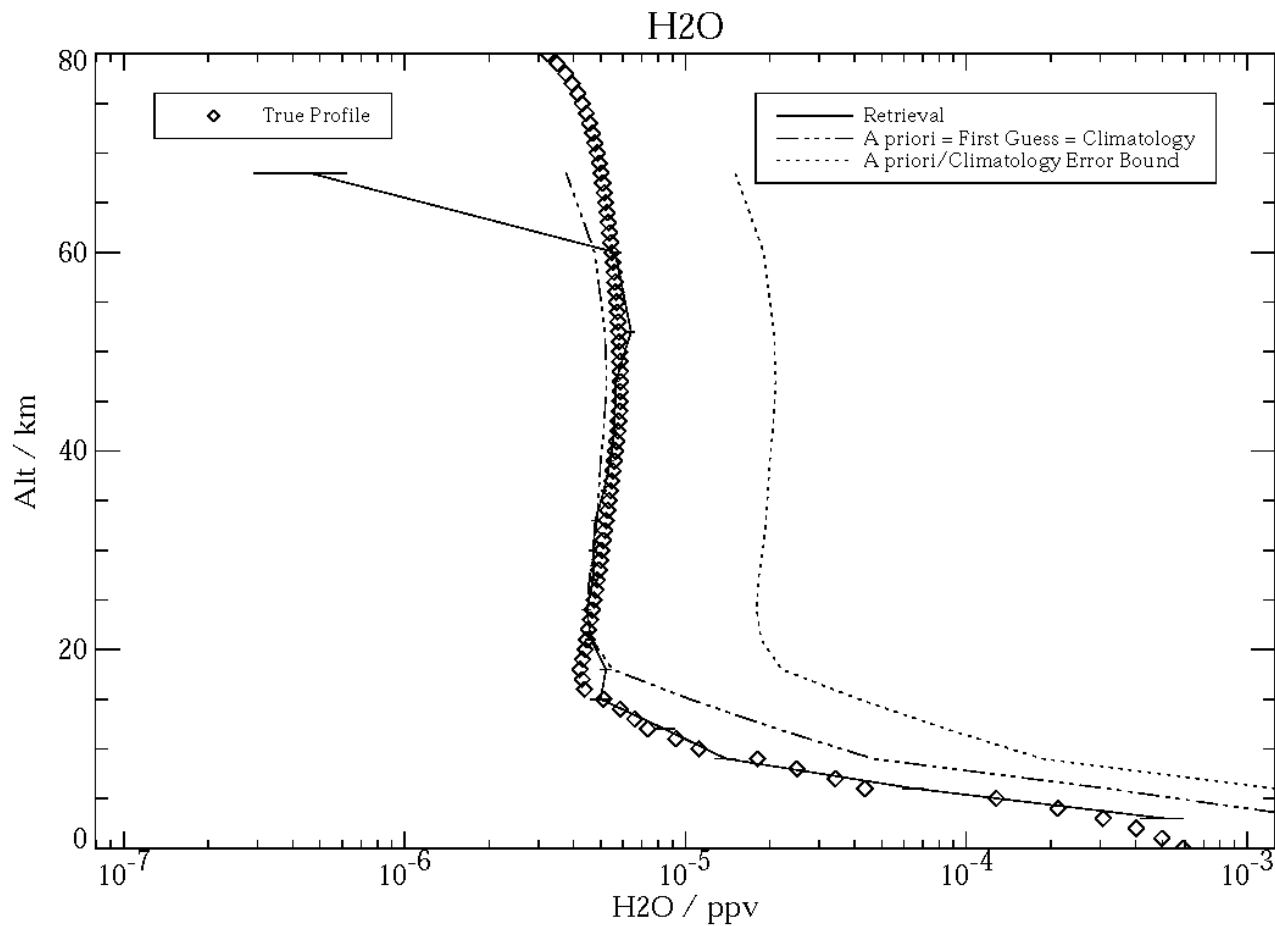   - NH_3 CH_3Cl HCN C_2H_2

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- Retrievals
  - New results using blind test 2 spectra
    - Joint retrieval of O_3 and H_2O using 10 microwindows

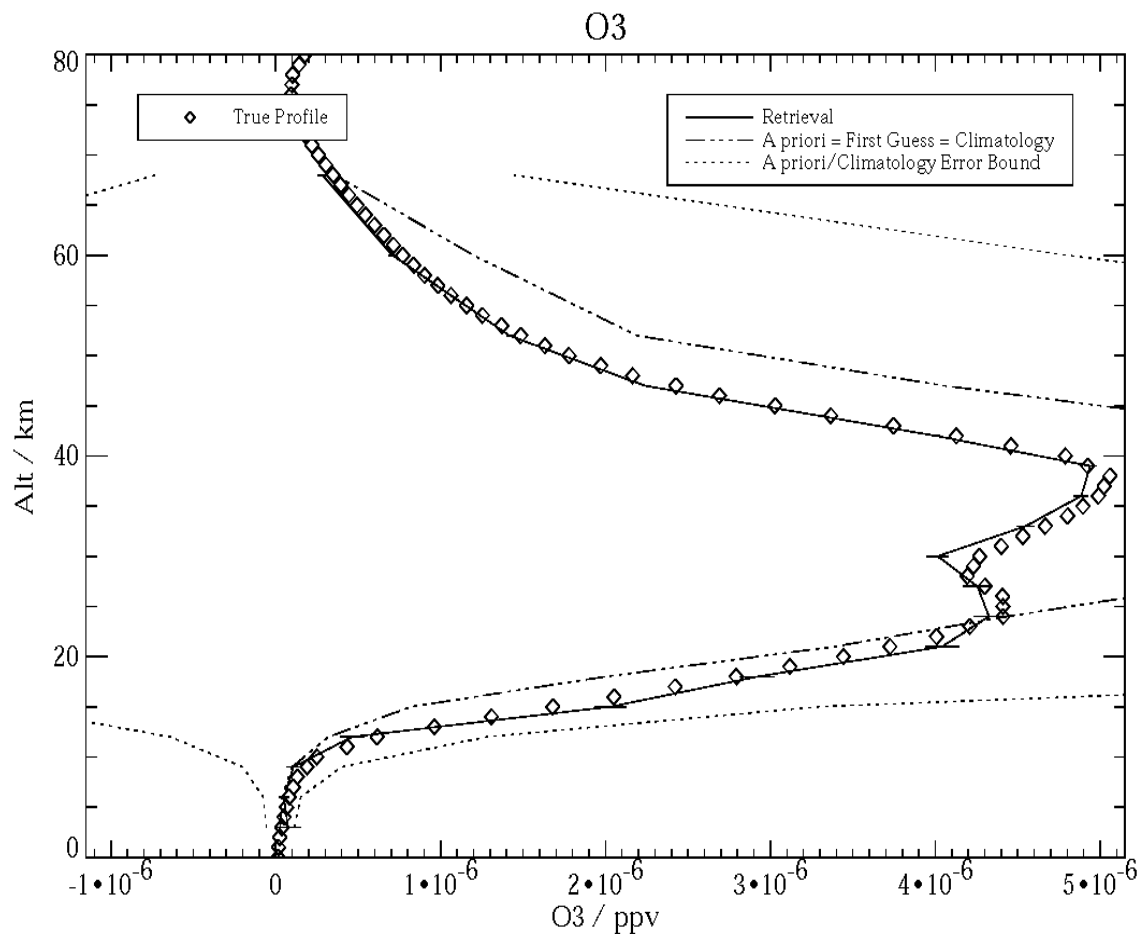- Conclusions
  - Retrieval produces sensible profiles

H2O

- Next Steps
  - (Micro) window selection
    - Refine to focus on lower altitudes (M.Parrington O_3)
  - Apply to simulated L1B data
  - More realistic error analysis (NB T & P)
  - Retrieval processor
    - Current CPU time ~30min per iteration for 10 cm^{-1} total b/w
    - $\rightarrow$ Efficiency improvements to allow use of larger spectral bandwidth i.e. (micro)windows.