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Excellent Progress on Envisat Level-1 Data Quality

Improvement in Level-1 data has enabled the Envisat instruments to observe the “Holy Trinity” of tropospheric chemistry; Ozone ($O_3$), Nitrogen Oxides ($NO_2$) and hydrocarbons (CO&VOCs)!

Data products retrievals have been demonstrated and are being used for scientific studies. Hydrocarbons in the troposphere are a critical advancement.

- ESA should accelerate the delivery of MIPAS lv2 data delivery
- ESA should expand tropospheric data product production, in particular, expand MIPAS list of Level-2 data products.
- ESA should continue to expand and improve tropospheric Level-2 data products from SCIAMACHY
- ESA should develop mechanisms to enable the production and distribution of validated, non-ESA-developed, scientific data products
Impressive Progress in Level 2 Scientific Data Products

The IR and UV/VIS instruments have several common data products; e.g., O₃, CO, HCHO.

- ESA should fully exploit the synergy of Envisat instruments

- ESA should encourage cross-validation and comparison working towards the creation of multi-instrument, consistent data products.

- ESA should encourage synergistic use of ENVISAT (and MetOp) products, e.g. from SCIAMACHY, MIPAS and IASI but also including aerosol products from AATSR and MERIS

  Initial steps could be

  - the distribution of a combined common data file
  - Meeting sessions / workshops / funding calls for synergistic use
Climate Change, ECVs and Air Quality

Long-term satellite data records are a critical contribution to the GCOS ECV program.

Several long-term data records combining scientific data retrievals from different sensors (O₃, NO₂, SO₂) were presented.

As individual satellite data records are reprocessed, the goal of creating consistent multi-satellite data records must be considered from the start by using as similar retrieval settings as possible.

• ESA needs to understand the requirements imposed by the creation of ECV data records during the planning for satellite data product re-processing and production, even if ESA itself does not produce the ECVs.

• Production of ECVs should be an ESA goal and the ESA work should not hinder the production of ECVs.
Climate Change, ECVs and Air Quality

Ozone and Aerosols are GEOS ECVs.

Total column ozone is a major ECV. The total column measurement will measure changes in both the stratospheric and tropospheric columns. As both the chemistry and the radiative effects are different for each atmospheric region, long-term data records that measure the changes in both regions are critical.

Several tropospheric ozone retrievals from both IR and UV/Vis methods were presented. Significant progress was demonstrated, but the tropospheric only products are not yet at the data quality level of the total column ozone.

• *Further development of the various approaches should be supported to facilitate later inclusion in the ECVs.*
Climate Change, ECVs and Air Quality

Water vapour is a GEOS ECV.

The water vapour products from the different instruments on ENVISAT and METOP can provide important input on the H₂O ECV which is complementary to the "meteorological" view on this variable.

*ESA should support water vapour products and consider them as an additional ECV in their program.*

User Feedback:
Access to bulk data, e.g. all lv2 files from SCIAMACHY for 2008), is difficult through the web interface.

*ESA should explore high volume data distribution protocols*