COST

COST Action 723:

Data Exploitation and Modeling
for the Upper Troposphere and Lower Stratosphere

www.cost723.org

Introduction

COST Action 723 will provide value-added quality-controlled datasets of geophysical parameters (e.g., ozone and water vapor) which are believed to be important for the study of radiative, dynamical, and photochemical processes in the upper troposphere / lower stratosphere altitude region (5 km above and below the tropopause).

Hitherto, there has been little information on these geophysical parameters in this region. The Action will contribute toward making the best use of observations, models and assimilation algorithms, and toward the definition of new strategies for future research.

COST723 Structure

- Model and data studies for the UTLS altitude region
- Assimilation as the central tool to consolidate models and observations
- 3 workgroups for the 3 areas: data and measurement techniques, data assimilation, and data interpretation
- Common workshops for all workgroups

Signatories

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Belgium	05/08/2003	**Netherlands**	19/03/2002
Bulgaria	09/09/2002	**Norway**	13/05/2002
Cyprus	15/07/2002	**Poland**	11/03/2002
Czech Republic	17/07/2002	**Spain**	18/04/2002
Denmark	06/03/2002	**Sweden**	27/03/2002
Finland	18/04/2002	**Switzerland**	11/07/2002
France	02/10/2002	**United Kingdom**	13/03/2002
Germany	06/03/2002		
Greece	06/03/2002		
Italy	23/04/2002		**= 17 countries**

Working Group 1:
Measurement Techniques and Campaigns

- Gather data and make it available to the Action.
- Critically assess the weak links in our measurement capabilities, help to identify new techniques and platforms to strengthen them.
- Improve the use of satellite data by the EO community, help to assess new sensors.
- Evaluate measurement campaigns and help plan and promote new campaigns.

Example 1: **RT modeling efforts for improved satellite data usage**

The figure shows data (brightness temperatures in Kelvin) from the upper tropospheric humidity channel of the AMSU-B instrument on the NOAA 16 satellite.
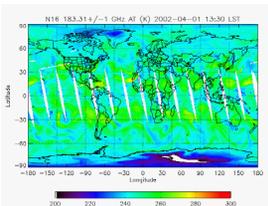
In WG 1 this is compared to radiosondes and other satellite instruments.

Example 2: **Improved radiosonde calibration techniques**

Hygrometer intercomparison campaign *LAUTLOS* at Sodankylä, February 2004

**Data** ↔ **Assimilation**

Interpretation

Working Group 2:
An Assimilated Ozone and Humidity Dataset

- Identify most relevant datasets of atmospheric constituents and other key parameters for UTLS.
- Develop and publish assimilation algorithms.
- Compute assimilated dataset and make it available.
- Quality control of observations and models.
- Analyze benefits of combining nadir and limb sounder information.
- Preliminary studies towards assimilation of instrument radiances from research satellites.
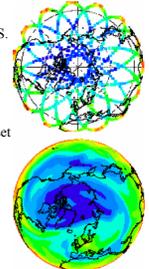
Example: **Synergy: different tools & unobserved species**

24 Sep 2002 12UTC: Ozone photochemistry
BIRA-IASB MIPAS analyses: red (high), blue (low)
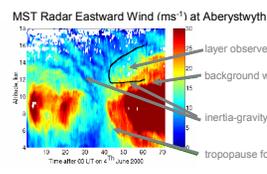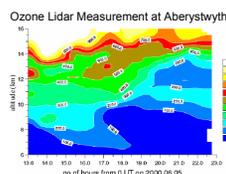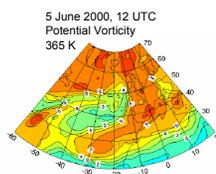
Ozone 475K

$ClO_x = ClO + 2*Cl_2O_2$ 475K

unobserved
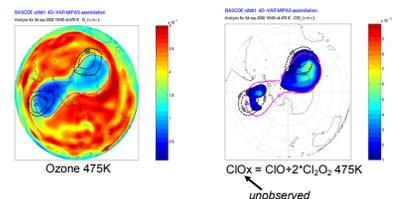
Working Group 3:
Assessing the State of the UTLS and Understanding the Relevant Processes

- Assess UTLS climatology (mean state and variability).
- Assess trends where possible.
- Study dynamical processes in the UTLS and their role in global change.
- Quantify anthropogenic impact on the UTLS.

Example: **Rossby-wave Breaking Event in June 2000**

5 June 2000, 12 UTC
Potential Vorticity
365 K

Ozone Lidar Measurement at Aberystwyth

MST Radar Eastward Wind (ms⁻¹) at Aberystwyth

layer observed by lidar
background wind shear
inertia-gravity waves
tropopause fold