

Agenda of the AEROSOL session of the GEMS general assembly

8 February 09.00-12.30

- 09.00 Breakout AER sessions: 1/ model configuration, 2/ satellite & 4D-VAR
Large Committee Room / Classroom
- 10.30 Coffee/tea break
- 11.00 Plenary AER session: report of breakout groups to plenary
- 11.30 Discussion on model sources
BB sources and injection height, industrial sources
- 12.30 Lunch break

8 February 13.30-17.00

- 13.30 Discussion on model sources
Dust, sea-salt, stratospheric sources, trends, variability
- 14.30 Aircraft aerosol measurements Andreas Milikin DLR
- 14.35 Discussion on model evaluation
- 15.30 Coffee/tea break
- 16.00 Months 13-30 implementation plan, reporting, and wrap-up
- 17.00 Adjourn

Project	MAM 2006	JJA 2006	SON 2006	DJF 2006/7	MAM 2007	JJA 2007
GHG Modelling at ECMWF	Continue validation of model transport, surface fluxes	Continue validation of model transport, surface fluxes	Assessment of GHG model performance in Data Assimilation	Assessment of GHG model performance in Data Assimilation	Assessment of GHG model performance in Data Assimilation	Prepare upgrades of GHG model
AER Modelling at ECMWF	Continue Validation of Aerosol Model	Continue Validation of Aerosol Model	Assessment of AER model performance in Data Assimilation	Assessment of AER model performance in Data Assimilation	Assessment of AER model performance in Data Assimilation	Prepare upgrades of AER model
GRG Modelling at ECMWF	Finalise Interfacing to CTM1	Continue Validation of IFS_CTM1 Interfacing	Continue Validation of IFS_CTM1 Interfacing	Assessment of GRG model performance in Data Assimilation	Assessment of GRG model performance in Data Assimilation	Assessment of GRG model performance in Data Assimilation
Pro 1 GHG DA System & Reanalysis	Validation of GHG Assimilation System	First trial GHG reanalyses	Production of GHG reanalysis 2003-2004, with reruns as needed	Production of GHG reanalysis 2003-2004, with reruns as needed	Production of GHG reanalysis 2003-2004, with reruns as needed	Prepare upgrades of GHG data assimilation system
Pro2 AER DA System & Reanalysis	Validation of GHG Assimilation System	First trial AER reanalyses	Production of AER reanalysis 2003-2004, with reruns as needed	Production of AER reanalysis 2003-2004, with reruns as needed	Production of AER reanalysis 2003-2004, with reruns as needed	Prepare upgrades of AER data assimilation system
Pro3 GRG DA System & Reanalysis	Validation of GHG Assimilation System	Validation of IFS_CTM1 Interfacing in 4D-Var	First trial GRG reanalyses	Production of GRG reanalysis 2003-2004, with reruns as needed	Production of GRG reanalysis 2003-2004, with reruns as needed	Production of GRG reanalysis 2003-2004, with reruns as needed
Pro 4 Technical Support &CTM Interfaces	GUI for Process control of IFS, OASIS4, CTM1	Complete GUI for Process control of IFS, OASIS4, CTM1	Interface IFS_CTM2, PREPIFS support for GEMS, including I remote users	Interface IFS_CTM3 and PREPIFS support for GEMS, including I remote users	Support for CTM interfaces & PREPIFS support for GEMS, including I remote users	Support for CTM interfaces & PREPIFS support for GEMS, including I remote users
Pro5 Technical observation processing	Complete data acquisition & re-formatting for 2003-2004	Begin data acquisition for 2000- 2002 & 2005-2006	Data formats and converters for GEMS observations and field variables	Data formats and converters for GEMS observations and field variables	Data formats and converters for GEMS observations and field variables	Data formats and converters for GEMS observations and field variables
Pro 6 Web interface and verification tools	Build web access to boundary conditions	Complete web-access to boundary conditions Begin archive of LAM runs	RAQ Data acquisition, Displays & Verification tools	RAQ Data acquisition, Displays & Verification tools	RAQ Data acquisition, Displays & Verification tools	RAQ Data acquisition, Displays & Verification tools

Model set-up

- 4-variable scheme in the troposphere
 - coarse dust and sea-salt calibrated against full ECMWF 10-bin scheme
 - gas precursor and accumulation mode aerosol from LMDZT (chemical lifetime improved)
 - fudge PM variable?
- 1 moment stratospheric aerosol scheme in the stratosphere
 - prescribed maps of sigma and r0, OK for background conditions only
 - to be tested first in LMDZT
 - to be ported to ECMWF
 - stratospheric mask:
 - p < 300 mb AND (wv < 7 ppmv OR and O3 > 100 ppbv)
- potential vorticity
- 2003, then 2003-2004
- T159L60 (or 91 ?) eq 1.125°

Model set-up

Number of sensitivity runs=function(CPU, evaluation)

- Sensitivity runs to be performed in the 9 months
w/o data assimilation (1-2 year periods)
 - vertical resolution L91 vs L60
 - wave model on/off
 - dust and sea-salt source functions
 - biomass burning emissions (sub-monthly variability)
- w data assimilation (1-2 week, up to 1 month periods)
(possibility of reducing the amount of satellite data assimilated
to speed up the system and afford longer test periods)
 - 1/ MODIS total ocean AOD, 2/ MODIS fine/total ocean AOD
 - 3/ MODIS fine/total ocean and total land AOD, 4/ total + SAGE
 - biomass burning emissions (sub-monthly variability)
- 1 final 2-year experiment with data assimilation

Model set-up - reanalysis mode

- Second radiation call with aerosols
- Diagnostics
 - list of variables
 - AOD @ 14 wavelengths (+extra UV and IR to be defined)
 - fine-mode AOD, absorption AOD,
 - effective radius of total size spectrum
 - mass concentrations, fudged PM (?)
 - profile of extinction coefficient @ 5 wavelengths (strat + trop)
 - radiation (surface UVB with interactive O3,
PAR, SW direct & diffuse, LW)
 - visibility
 - temporal sampling: 3 hourly (+daily and monthly means)
 - wind-sector sampling (Mace Head, Cape Grim)

Emissions

- Fossil-fuel

SO₂/BC/OC = AEROCOM (updated from EDGAR, ships, ...)

consult with GRG and Frank first to avoid inconsistencies

BC from AEROCOM and CO from RETRO will be compared

H₂S = scaled to SO₂

neglect ammonium and nitrate

2 levels of injection

seasonal cycle = paste from RAQ in Europe as possible upgrade

weekly cycle = same

diurnal cycle = same

annual increase rate = projections to 2003/04 from Laxenburg

Emissions

- Biomass burning GFEDv2, monthly, 1997-2004, ASCII, $1^\circ \times 1^\circ$
SO₂ = MS to discuss how to get it
BC / OC / PM_{2.5} / TPM

injection height = AEROCOM?,

MS to review AEROCOM, OB to check MISR products on plumes

sub-submonthly variability =

$F(x,y,t,\text{day},\text{month}) = \text{CLIM}(\text{month}, X, Y) * \text{hotspot}(x,y,\text{day}) * f(t)$

hotspot = smooth function from previous days if no data

ocean AOD assim + hotspot = 1 + f(t) = 1

ocean + land AOD assim, some refinements

some more investigation needed, consistency with GRG

Emissions

- Dust

- YB and PG to provide a benchmark dust source for 2003 development on road dust and arable dust
 - SK to investigate for a further dust source

- Sea salt

- YB to provide a benchmark sea-salt source for 2003
 - Combination of Monahan and Marttensson (T0+16)
 - Source function from Andreas (revised Smith supermicron)
 - Revised source formulation from MAP in the long run

Emissions

- Natural VOC
 - Guenther et al monoterpenes
- DMS
 - check with Sylvia Kloster (JRC)
 - oceanic DMS climatology + transfer function
- Volcanoes
 - continuous emissions: AEROCOM
 - explosive emissions: TOMS? (SB)
- Stratospheric source
 - chemical production from OCS prescribed
 - (using correlations with other LL species in the merged system)

Merged satellite product for validation:

- Stefan will provide a document with his comparisons (MODIS, MISR, TOMS, AVHRR, POLDER)
- dataset **without** MODIS for validation of analysis

Observations to be used in the first reanalysis:

- MODIS data with a bias correction and pixel-by-pixel error estimate over **ocean only** (for now)
- Later on investigate use of land retrievals and ratio fine/coarse mode

Observation screening and thinning:

- closest pixel
- Blacklist “problem” area

Bias correction for MODIS:

- not recommended to use Remer et al. '05 (need to come up with our own)

MSG AOD:

- under development, will be used for validation and in the future for assimilation if proven good

4-variable scheme:

- preferred for the assimilation if can be made available in the next couple of months

PM2.5 and PM10:

- Nicolas is going to see how we can get this from his model (PM10 possible; PM2.5 more difficult)

Archiving of forecast and analysis data:

- 3-hourly but daily and monthly means will also be used
- ECMWF will have standard reanalysis archiving time (3-hourly), but archiving frequency can be increased to hourly

First year activity report

individuals to send their contribution to WP leaders by 10 March

WP leaders to send to OB by 20 March

OB to send to TH by 31 March

WP leaders

1 OB

2 MS

3 JJM

4 COD + IC

Evaluation strategy

No requirement for centralised aerosol data at ECMWF for the moment
WDCA, AERONET and other database being maintained already

AEROCOM: located at LSCE, ok for daily and monthly point data,
2003-2004 AERONET ok, EMEP?, satellite?

Possibility of including more AOD data into AEROCOM (Brewer+PFR)

List of case events for 2003/2004 (HB+SK, link to GRG)

Need for some headroom for evaluation using DLR data & EARLINET

Need for a few common diagnostics with RAQ and GRG

Future need for verification data at ECMWF in the operational phase
using the MetPy tools. Need to secure NRT access to EMEP (RAQ)
and AERONET.

Scoring against AERONET gridded data
Need to account for data error.