

In-service Aircraft for a Global Observing System

WP-2 Coordination with global networks, users and airlines

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IAGOS-ERI Annual Meeting 2009, Toulouse, 7-9/10/2009

WP-2 : Coordination with global networks, users and airlines

No	Objective/Deliverable	Partner	due
D2.1	Documentation of IAGOS-NRT products for provision to GMES	CNRS	46
D2.2	Documentation of scientific database of the RI: Structure, data products (incl. QA/QC) and links to other data centres	CNRS	46
D2.3	Documentation of NRT-data transmission through AMDAR to the GTS & WIS	MF	46
D2.4	Model for Memorandum of Understanding between the RI and Airlines	AIRBUS	46



Task 2.1 : Coordination with GMES for real time data provision

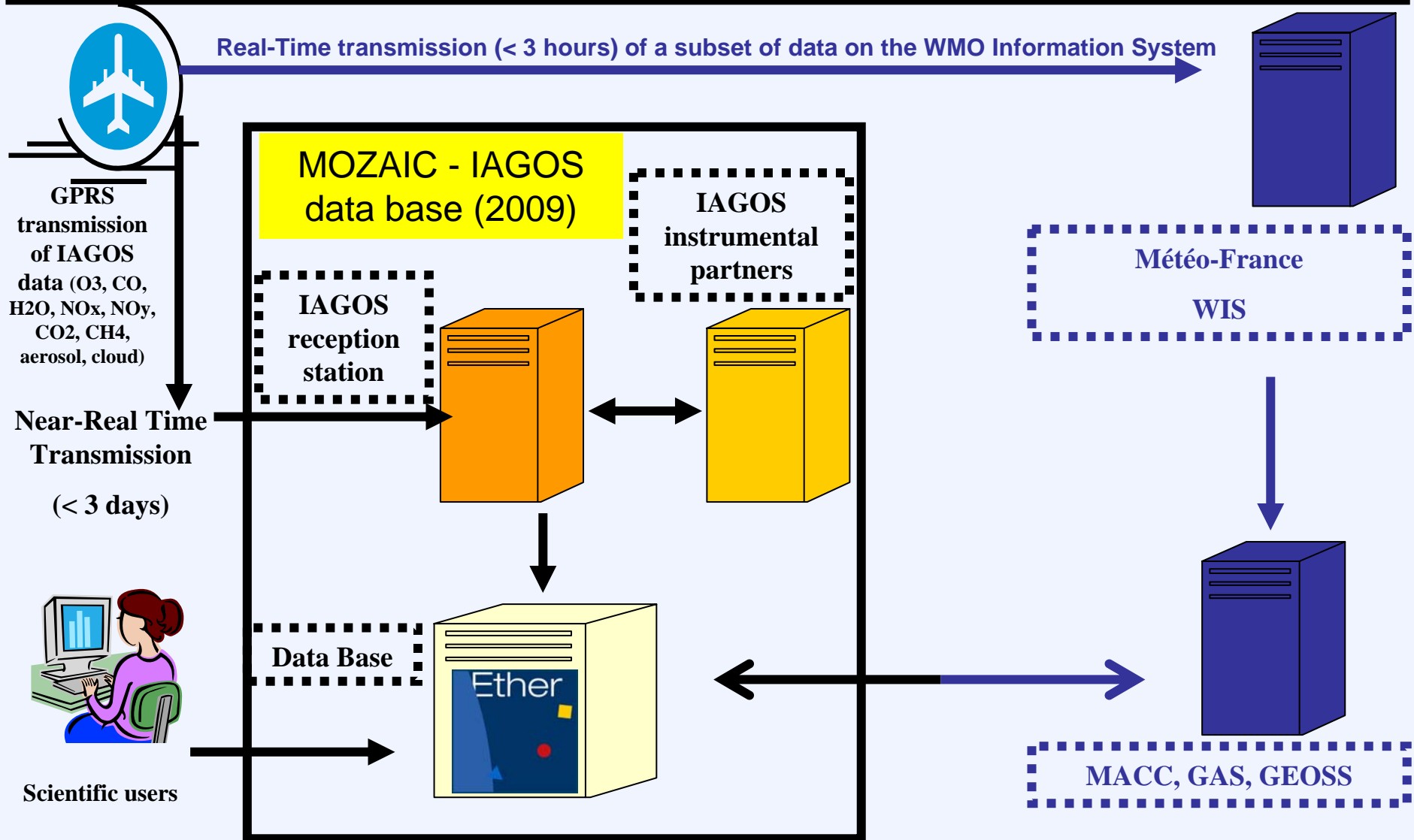
Deliverable	D2.1: Documentation of IAGOS-NRT products for provision to GMES (CNRS/M46)
Milestones	<p>M2.1.1: Investigate NRT-data transfert between data centres (CNRS / M24)</p> <p>M2.1.2: Investigate use of WIS for optimal NRT data flow (CNRS / M36)</p> <p>M2.1.3: Documentation of IAGOS NRT products (CNRS / M46)</p>
Status	<p>FZJ and CNRS are coordinating the datalink between IAGOS and the pre-operational EU-PF7 GMES Atmospheric Service: MACC (Monitoring of Atmospheric Composition and Changes). FZJ and CNRS are involved in 2 sub-projects of MACC: GRG (Global Reactive Gases) and DATA-INSITU. Next meetings where the coordination will be prepared:</p> <ul style="list-style-type: none"> - GRG kick-off meeting (GAW station Zugspitze/Hohenpeissenberg, 6-8 October 09): defining the GRG service evolution in MACC and the liason with validation data. - D-INSITU kick-off meeting (NILU, Oslo, 23-24 November 2009): D-INSITU is the subproject responsible for the collection of NRT and validated in-situ observation data under the INPUT DATA CLUSTER of MACC. <p>FZJ is representing MOZAIC & IAGOS in GEOSS (GEO Workshop, Istanbul, 8 October 2009): the European contribution to Global Data Sets relevant to the implementation of the GEO 2009-11 WP</p>
Achievements	Description sheet of NRT IAGOS data (MF)
Deviations from Contract	None



IAGOS: data transmission

RESEARCH (CNRS)

OPERATIONAL (Météo-France)



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Forschungszentrum Jülich
in der Helmholtz-Gemeinschaft



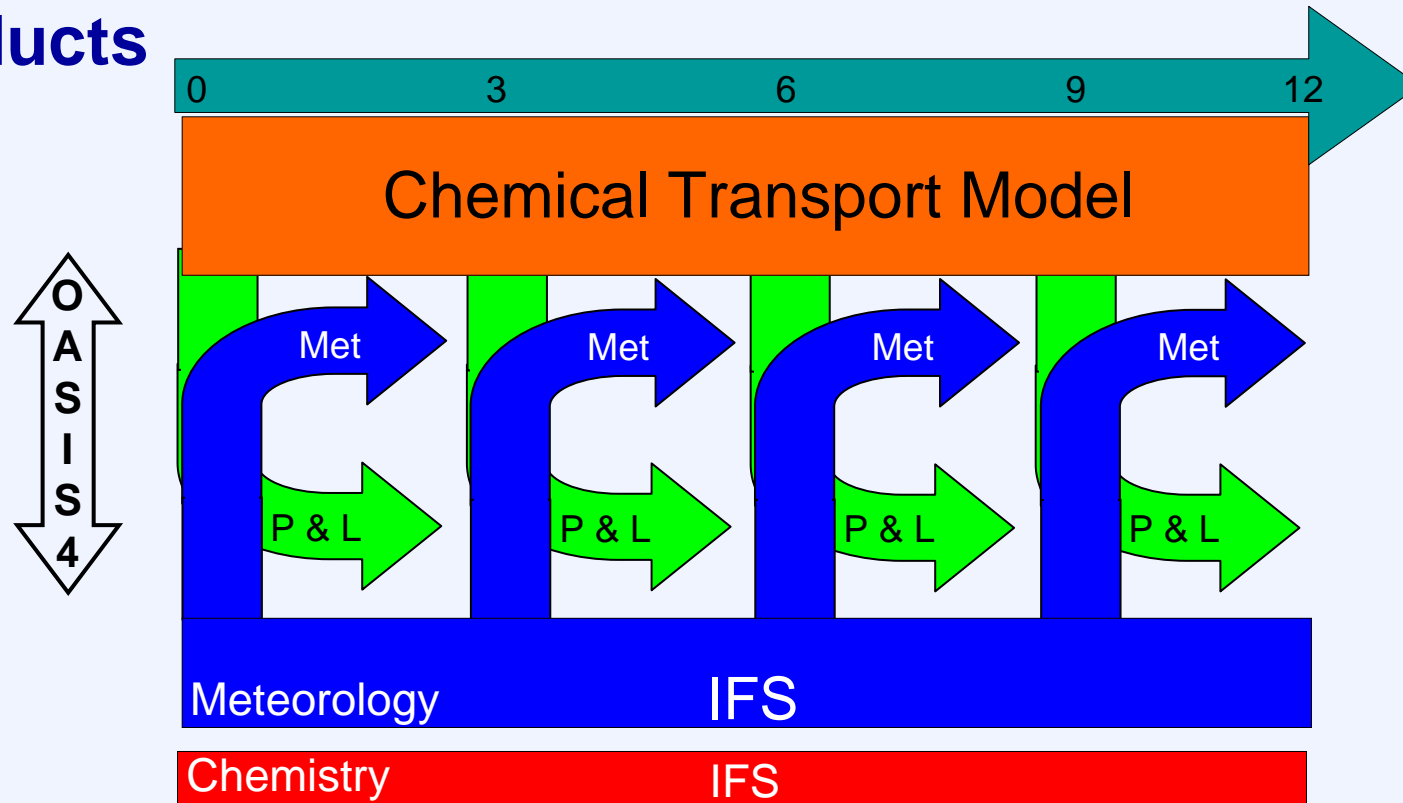
Global and regional Earth-system Monitoring using Satellite and in-situ data

An EC FP6 Integrated Project, developing:

- global modelling and data assimilation for greenhouse gases, reactive gases and aerosols
- a global production system, including surface-flux estimation
- collaborative regional modelling, data assimilation and forecasting of air quality for the European domain

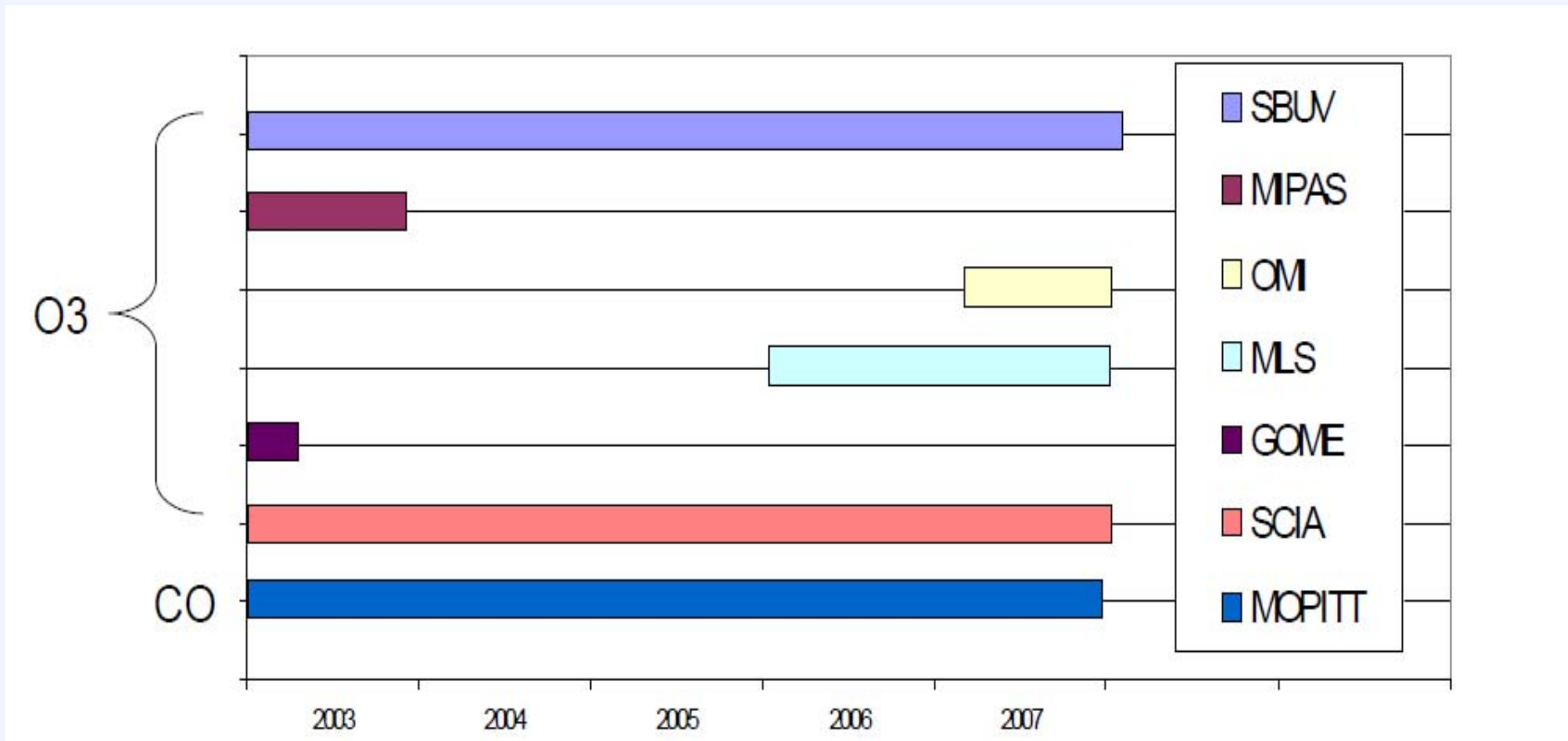


GEMS: Development of a coupled reactive-gas forecasting system with 4D-Var assimilation of satellite products



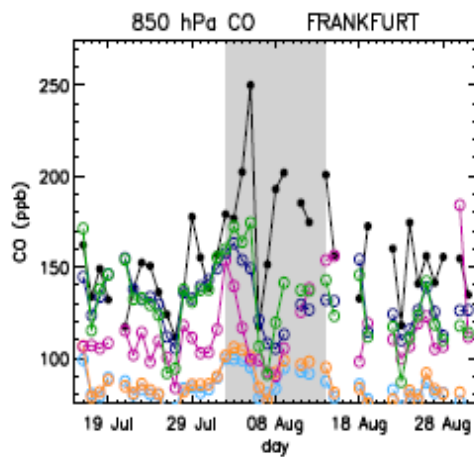
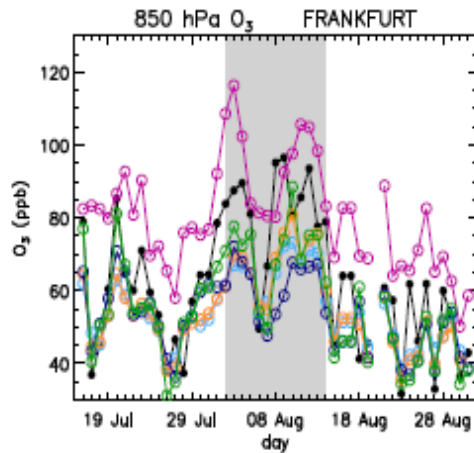
3 CTMs: MOZART, TM5 and MOCAGE
MOZART chosen for data assimilation with coupled system

O3 and CO satellite data assimilation in GEMS-GRG Reanalysis 2003-2007



European heat wave during summer 2003

Ordonez et al., ACPD, 2009

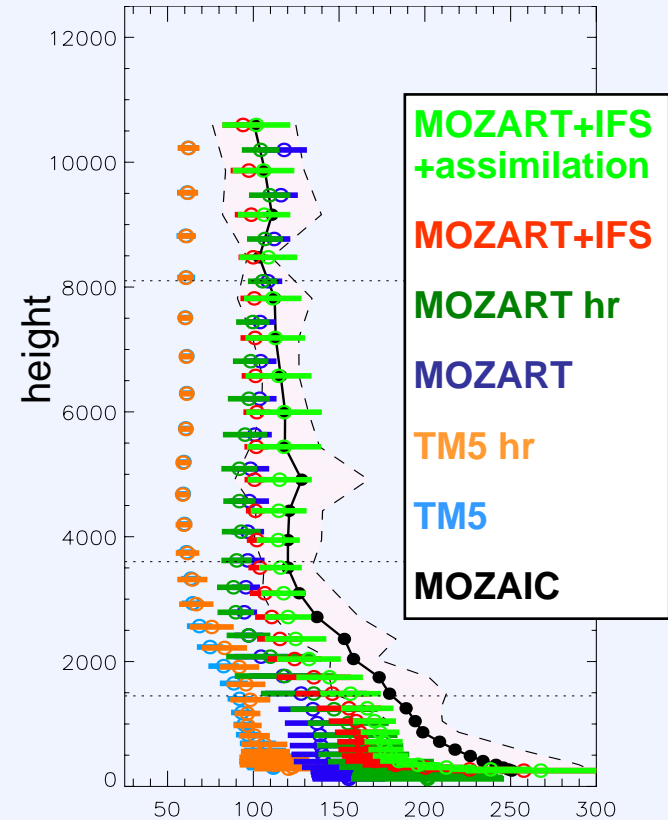


CTMs only vs MOZAIC

- MOCAGE
- MOZART hr
- MOZART
- TM5 hr
- TM5



CTMs + coupled system vs MOZAIC



The 2003 summer heat wave is not yet matched by up-to-date global chemistry transport models. To take into account the impact of the long-range transport of pollution on regional air quality, routine aircraft data and progresses in data assimilation are needed.

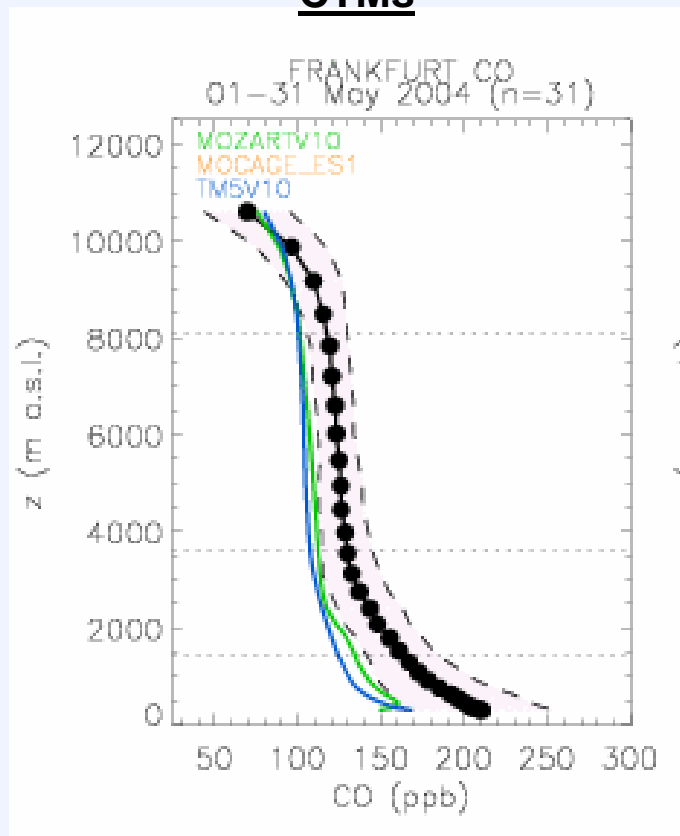


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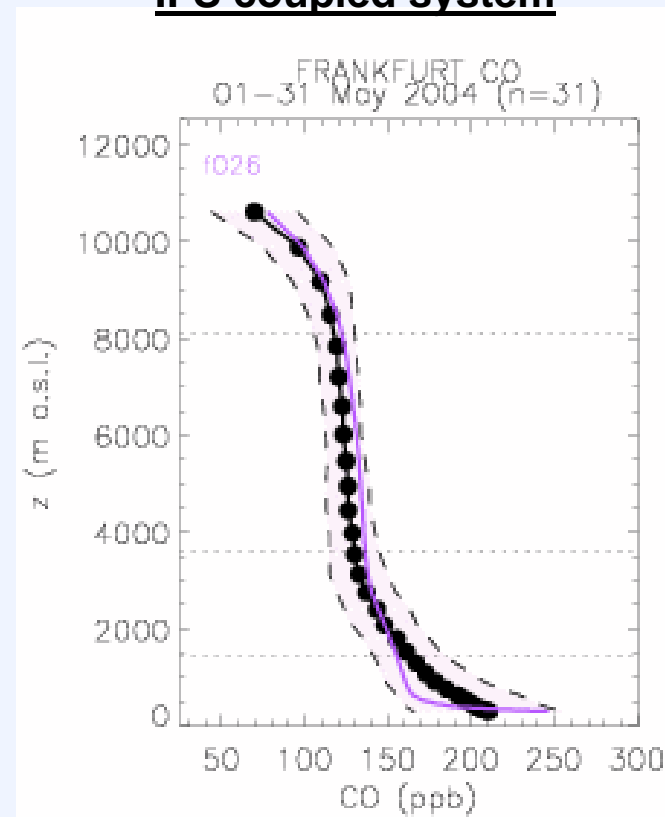
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FRANKFURT May 2004 – MOZAIC CO profiles

CTMs



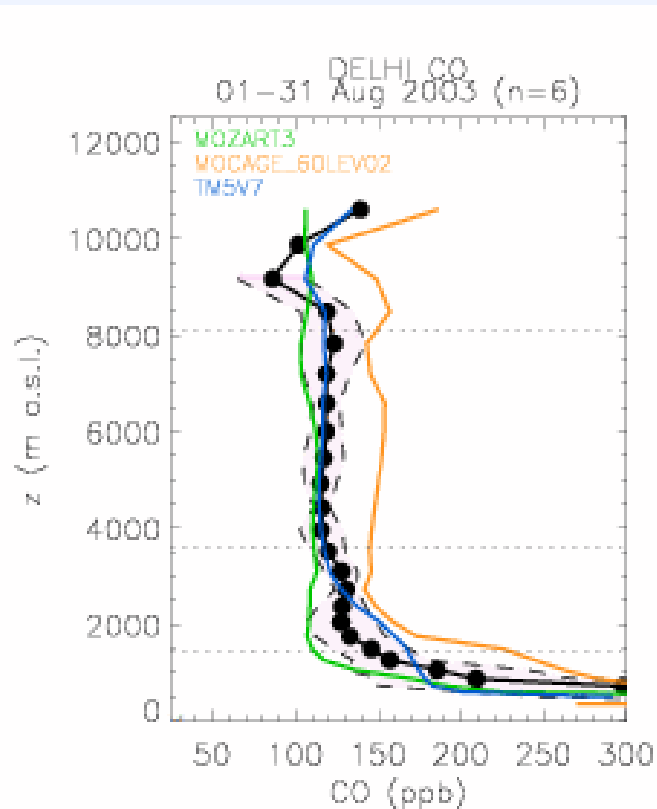
IFS coupled system



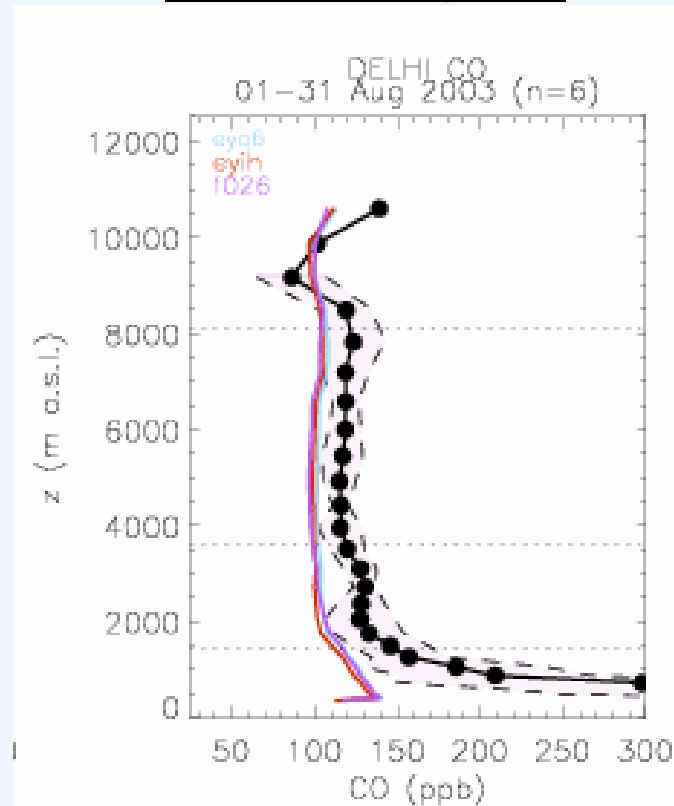
Assimilation for May 2004 of MOPITT tropospheric CO columns improves fit of tropospheric CO profiles to MOZAIC data in Frankfurt

DEHLI August 2003 – MOZAIC CO profiles

CTMs



IFS coupled system



Assimilation for August 2003 of MOPITT tropospheric CO columns does not improve fit of tropospheric CO profiles to MOZAIC data in Dehli

Task 2.2 : Coordination with scientific users

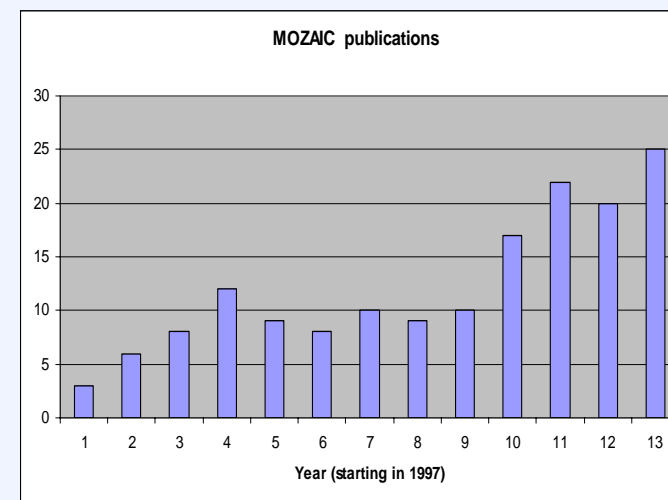
Deliverable	D2.2: Documentation of scientific database of the RI: Structure, data products (incl. QA/QC) and links to other data centres (CNRS / M46)
Milestones	<p>M2.2.1: Define structure of the scientific data base of the new RI (CNRS /M24)</p> <p>M2.2.2: Establish links to other data centres (CNRS / M36)</p> <p>M2.2.3: Documentation of IAGOS scientific products (CNRS / M46)</p>
Status	<p>Scientific data base:</p> <ul style="list-style-type: none"> - structure defined, operational (dozens of MOZAIC co-inv. registered), supported by ETHER (CNES, INSU-CNRS), - includes MOZAIC data from 1994 and subsidiary infos (meteorology & Lagrangian history of air masses), ready to include the new IAGOS data. <p>Reception station and technical data base:</p> <ul style="list-style-type: none"> - the reception station is installed upstream of the scientific data base to receive IAGOS raw data from the GPRS transmission, it will be used by all partners to exchange raw data and QA/QC data - under definition and tests, a technical data base will help to manage the maintenance of O3 and CO instruments inside P1 (need for coord. with WP4.4). <p>Documentation of MOZAIC and IAGOS scientific products will be done in consultation with other centers to define metadata.</p>
Achievements	The core of the scientific data base of the new RI is defined & operational. It is ready to receive IAGOS data from the GPRS transmission.
Deviations from Contract	None



Scientific exploitation of MOZAIC data:
> 150 peer-reviewed publications using MOZAIC data
<http://mozaic.aero.obs-mip.fr/web/>

• **List of international institutes using MOZAIC data:**

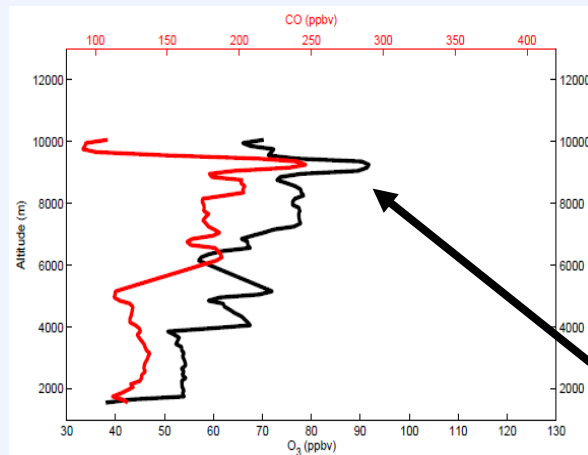
- **Brasil** : CPTEC/INPE
- **Canada** : Dalhousie University, Air Quality Research Division (Environment Canada), University of Toronto
- **China** : Hong Kong Polytechnic, University Nanjing, University Shanghai Jiaotong University, National Central University of Taiwan
- **France** : LACy (CNRS, La Réunion), CNRM (Météo-France, Toulouse), LATMOS (CNRS, Paris), LISA (CNRS, Paris), LA (CNRS, Toulouse), LMD (CNRS, Paris), LOA (CNRS, Lille), Airbus (Département Environnement, Toulouse)
- **Germany**: DLR, Max Planck Institute for Meteorology (Hamburg), Max Planck Institute for Chemistry (Mainz), Forshungszentrum (Julich), GeoForschungsZentrum (Postdam), Hemoltz Centre (Postdam), Deutscher Wetterdienst - German Weather Service, Leibniz-Institute for Tropospheric Research.
- **Greece** : Academy of Athens
- **India** : Indian Institute of Tropical Meteorology (Pune)
- **Italia** : Universita' degli Studi dell'Aquila
- **Japan**: Nara Women's University
- **Netherlands** : KNMI
- **Norway**: University of Oslo, NILU (Norwegian Institute for Air Research)
- **South Africa** : University of Kwazulu-Natal (Durban), National Laser Centre (Pretoria)
- **Sweden**: Chalmers University of Technology
- **Switzerland** : ETH (Zurich), Ecole Polytechnique Fédérale de Lausanne (Lausanne)
- **United Kingdom**: UKMO, ECMWF, Cambridge University, Institute for Aviation and the Environment (Cambridge), King's College (London)
- **United States of America** : NOAA (Boulder, CO), NCAR (Boulder, CO), Goddard Earth Sciences and Technology Center, NASA JPL (Pasadena, CA), NASA Langley Research Center, University of New Hampshire, University of Iowa, University of Colorado, University of California, University of Wisconsin-Madison, Goddard Space Flight Center, Georgia Institute of Technology, George Mason University, Virginia Harvard University, University of Pennsylvania



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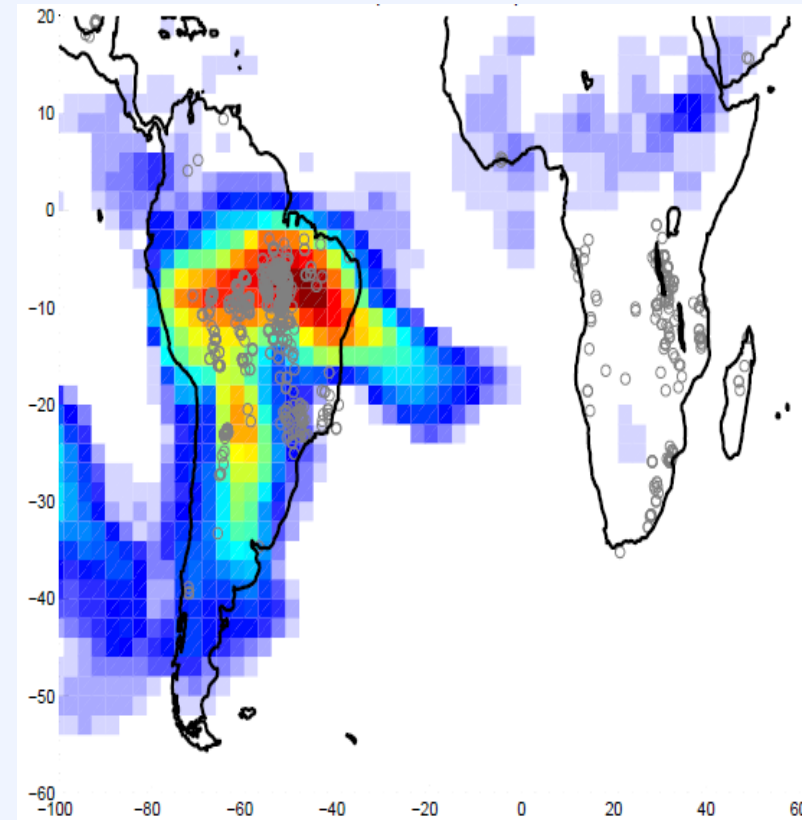
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MOZAIC scientific data base: example of connex data with air masses Lagrangian history



MOZAIC vertical profile over Windhoek, Sept. 5, 2006 (Air Namibia)

Biomass
Burning
Plume



Retroplume of air parcels sampled inside the biomass burning plume over Windhoek (see MOZAIC vertical profile on left figure) within the lower troposphere (0-3 km altitude) and during the period August 29-23, 2006. Grey circles: biomass fires detected by MODIS during the period of interest.

Task 2.3 : Coordination with AMDAR

Deliverable(s)	D2.3: Documentation of NRT-data transmission through AMDAR to the GTS & WIS (MF / M46)
Milestone(s)	M2.3.1: Implementation of NRT data transmission into E-AMDAR (MF / M36) M2.3.2: Adaptation of NRT data transmission to WIS (MF / M46)
Status	Real-Time Transmission designed with help of E-AMDAR. To be discussed at this meeting and at E-AMDAR TAG meeting (Nov. 2009)
Achievements	Description of NRT IAGOS data IAGOS BUFR Template submitted to WMO (Expert Team on Data Representation & Codes)
Deviations from Contract	None

Task 2.4 : Coordination with Airlines

Deliverable(s)	D2.4: Model for Memorandum of Understanding between the RI and Airlines (Airbus / M46)
Milestone(s)	M2.4.1: Establish the legal status of an aircraft platform (AIRBUS / M12) M2.4.2: Risk analysis for RI in collaborating with airlines (AIRBUS / M24) M2.4.3: Provide MoU between RI and airlines (AIRBUS / M46)
Status	Legal status: contact/collaboration to develop with WMO Risk analysis: contact/collaboration to develop at EASA MoU: Needed for Lufthansa and Air France, already signed for China Airlines NRT data transmission to be discussed with AF, China Airlines, ...
Achievements	
Deviations from Contract	M2.4.1 postponed to year 2 due to the late replacement of Airbus-UK by Airbus-F

Summary of progresses towards objectives

Significant results

- Coordination with the GMES Atmospheric Service for the provision of IAGOS-NRT products: work is in progress with EU/FP7 MACC and with GEOSS
- Coordination with scientific users: the core of the scientific data base is defined & operational. It is ready to be extended to new IAGOS data received by GPRS transmission.
- Coordination with airlines: collaborations to develop with WMO (legal status) and with EASA (risk analysis) are defined.



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Other

- Deviations from Annex I
 - *M2.4.1 postponed to year 2 due to the late replacement of Airbus-UK by Airbus-F*
- Use of Resources
 - IAGOS-ERI resources: little has been used so far (participations to meetings)
 - CNES support: 50k€/year for the development of the data base (labour cost)
 - INSU-CNRS + OMP support: 67k€/year for operating costs of MOZAIC, under review to evolve towards IAGOS operating costs.
- Actions for second year
 - *Define the MoU for airlines involved in 2009-2010: LHT, AF*
 - *Develop collaboration with EASA (risk analysis) and with WMO (legal status of a/c platform)*
 - *Involve other airlines and formalize their contributions (Iberia, Cathay Pacific, South African Airways or Air Namibia, Pantheon and/or Olympic Air, Finnair, Qantas,...)*
 - *agreement with ECMWF to include into the IAGOS data base ECMWF meteorological data along IAGOS flight routes*
 - *Feedbacks between IAGOS-ERI partners to define the instrumental data base for maintenance (need also coordination with WP 4.4)*

