AMMASAT

Use of satellite data over the AMMA region is essential, as this area is insufficiently covered by surface networks.

This is true as well for meteorological parameters as for land and sea surface properties, or chemistry of the atmosphere.

Today, operational satellite data are available since more than 20 years. They are currently used for weather analyses, less for climate or process studies. Experimental satellites also provide a number of more refined products over shorter time periods.

However, the use of satellite data is still limited by the difficulty to get (or to chose) accessible satellite products, properly calibrated, with estimations of their errors.
This Satellite component is essential for all the scales considered in AMMA (From climatic studies at continental scale to local studies on particular meteorological events)

AMMASAT has two components:

- The choice, eventual production and validation of relevant satellite products.
- The setting up of a data base constituted by these products.
Sub-tasks of AMMASAT:

Precipitation : Michel Desbois, with participations of partners CNRS, IRD, AGRHYMET, Uni Bonn, CNR ISAC (+ LAMMA) + contribution of University of Reading

Cloud cover and Cloud properties : Rémy Roca (CNRS), Jörg Schulz (formerly Uni. Bonn; now Climate SAF)

Cloud winds : André Szantai (CNRS)

MCS’s tracking : working group with 3 partners (CNRS, IRD, Météo France)

Water vapour : Laurence Picon (CNRS)

Radiative fluxes : Michel Viollier (CNRS)

Aerosols : Isabelle Chiapello (CNRS)

Land surface properties : Mehrez Zribi (CETP CNRS) , then Laurent Kergoat, Eric Mougin (CESBIO Univ of Toulouse), partners MEDIAS France, IRD,…

Sea surface properties and fluxes : Abderrahim Bentamy (IFREMER) partners CNRS, ENEA, Uni Bonn

Atmospheric chemistry : Andreas Richter (Uni Bremen) partners KNMI, Univ of Toulouse
Precipitation:

The “precipamma” group already met three times. An intercomparison exercise of existing precipitation products (as GPCP, TAMSAT,… ) and products specially developed for AMMA (In CNRS/IPSL, CNR ISAC + LAMMA, Uni Bonn) has been defined for the African rainy season of 2004. IRD an AGRHYMET provided ground validation data sets (krieged data from CILSS network, data from specific AMMA sites). The results of the exercise are expected to be ready for the end of 2005. Contacts are already maintained with other WPs of AMMA requiring precipitation fields at different space time scales.

(for details, see Franck Chopin, or working group PRECIPAMMA tonight)
Status of the precipitation sub-working group: PRECIPAMMA

Abdou Ali (Agrhymet), Abou Amani (Agrhymet), Alessandro Battaglia (University of Bonn), Jean-Claude Bergès (University of Paris 1), Franck Chopin (CNRS/IPSL/LMD-Palaiseau), Michel Desbois (CNRS/LMD-Palaiseau), David Grimes (University of Reading), Isabelle Jobard (CNRS/LMD-Palaiseau), Henri Laurent (IRD/LTHE – Grenoble), Thierry Lebel (IRD/LTHE – Grenoble), Rémy Roca (CNRS/LMD-Paris), Mireille Tomasini (Météo-France), Francesca Torricella (CNR/ISAC-Bologna), Samantha Melani (LAMMA-IBIMET Firenze)

Definition of an intercomparison exercise between the different methods:
2004 is chosen for the exercise (presence of MSG + TRMM, availability of surface data)
Products should have the following resolution:
For the whole West African area: 10 days, 0.5, 1 and 2.5 degrees
For the supersites: 6 hours, 1 day, 10 days; 0.1, 0.5 degrees

Planning of the exercise:

- Results of the algorithms before the fall of 2005, first processing of the whole 2004 season performed
- Intercomparisons in AGRHYMET: krieged 10 days raingauge data for 2004 provided to the whole team, satellite products sent to AGRHYMET
- Preliminary results at the AMMA Dakar conference (meeting tonight)
- Two intermediate meetings before this conference (1st meeting in Bologna on 24 June, second 18 November 2005 in Palaiseau)
Estimated precipitation (SRA method, July 2004)
AMMASAT - Dakar - 29 Novembre 2005

Niger River

Local coordinates in km; Origin at 2°E; 13°N

Say
Baleyara
Banizoumbou
KPAYEROUN
INA2
BASSILA
BETEROU
BIRNI
DJOUGOU
OKPAR
A
PARAKOU
PARTAGO
PENESSOULOU
KOKOUBOU
TCHETOU

Zone CILSS

Réseaux AMMA-CATCH

Enregistreurs
- Pluie
- Aquifère
- Rivière
- Météo
- IDAF-Photon

Observateurs
- Pluie
- Aquifère
- Rivière
- Végétation
Cloud cover and cloud properties:

The basic choice is to use new MSG products elaborated in CMS Lannion (France) for the purpose of the Nowcasting SAF and other applications (these products are available in near real time). The climate SAF products, based on the same algorithm, will be considered when this SAF will be operational.
Cloud winds: Experimental products using the different channels of MSG have been tested in CNRS/IPSL/LMD. The capacity of using the AMV’s (atmospheric motion vectors) produced by EUMETSAT has also been worked on. (for details, contact André Szantai- LMD)
MCS’s tracking: Climatological series exist now on 20 rainy seasons observed by METEOSAT (see Karim Ramage for details and access). A procedure using ISIS is ready in CNRM for operational needs.
Water vapour: It is planned to use existing products. Specific use of MSG new WV channels is foreseen, as well as microwave data (AMSU-B). Also, future products from Climate SAF will be considered later. IASI products will probably not be available for the 2006 rainy season (launch of METOP in June).

Products MODIS, MERIS, AIRS have been put on the Ammasat data base.
Radiative fluxes:

no specific development, regional climatological studies (from ERBE, CERES) have progressed (20 years series are being worked on). Other studies will be done from GERB (on MSG) when the problems of this instrument will be solved
Aerosols:
first developments from Parasol and Modis, studies of retrievals from MSG, preparation of the use of the CALIPSO lidar.

1. Detailed characterization of the aerosol in the AMMA region from the A-TRAIN (2005-2006) MODIS PARASOL first, then CALIPSO (launch postponed to Feb-March 2006), MODIS PARASOL

2. Climatology of aerosols from 1979 to 2008 based on the combination of TOMS/OMI and METEOSAT/MSG

3. Aerosol observations derived from MSG with the help of ICARE

Isabelle Chiapello (LOA)

Meteosat IR - IDDI - aerosols optical depth (Michel Legrand)
**Continental Surface** (coord. L Kergoat)
CESBIO, CETP, LTHE, CNRM, MEDIAS/POSTEL, LMD, UMVL, LERMA.

**Data acquisition and processing**

- *High resolution data*: data acquisition has started in 2005 (thanks to CNES): Time series of SPOT data (20m), supersites coverage with 2.5 m SPOT data, local site very high resolution data (IKONOS) and Mali mesoscale window coverage with Landsat data.

- *Low resolution data*: Existing MODIS, SPOT-VGT products have been customized, SAFLand (MSG) data are available and delivered to AMMA after customization at MEDIAS/POSTEL (starting July 2005). Feasability of NOAA/AVHRR historical data processing has been established (MEDIAS/CESBIO). Database of Quickscat data (UMVL), wetlands, surface temperature cycle and surface emissivity (LERMA) have been built. Free access data have been acquired (ASAR, AMSR-E).
Validation of land surface products:
- Leaf Area Index (LAI), and vegetation cover (Fcover) for three mesoscale windows
- Soil moisture
- Land use land cover: classification with existing high resolution data (Landsat and SPOT) ground truth from 3 supersites

Algorithms and products development:
In addition to the above mentioned actions, specific algorithmic developments are carried-out at CESBIO, CETP, LTHE.

All these actions will be intensified in 2006:
Data acquisition,
Coordinated processing of high-resolution data for the 3 mesoscale window,
Coordinated processing of NOAA/AVHRR historical archive
Products validation
Algorithm and products developments
SITE 17
Surface Soil Moisture from Aug 9 to 31

Derosnay, Kergoat

AMMASAT - Dakar - 29 Novembre 2005
Sea surface temperature and fluxes, other sea parameters

No specific development, but products from IFREMER, CETP and ENEA exist and will be integrated in the data base. *(A. Bentamy responsible in IFREMER)*

Atmospheric chemistry

No specific development yet in France (the coordinator is Andreas Richter, from Bremen). Contacts exist between the AMMASAT data base and the ETHER data base, which is concerned with satellite products of atmospheric chemistry. It appears that chemistry products will be probably stored in another data base, related to the coordinator of this task.
AMMA-SAT Database

K. Ramage (LMD/IPSL), S. Cloché (IPSL)

L. Eymard (CETP/ISPL)
The data


Data characteristics:

- Geophysical products (level ≥ 2):
  - regional subsets of operational products,
  - research products (for validation purposes, alternative to the operational products, …).
- (Re-) gridded on a regular longitude-latitude grid,
- Sampled or interpolated to fit the spatial resolutions predefined for each AMMA area,
- In NetCDF format (COARDS Convention).

Areas of Study

<table>
<thead>
<tr>
<th>Area</th>
<th>Resolutions</th>
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<tbody>
<tr>
<td>Atlantic-Africa</td>
<td>0.50°, 0.25°, 0.10°</td>
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<tr>
<td>West Africa</td>
<td>0.10°, 0.05°, 0.01°</td>
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<tr>
<td>Local Scales</td>
<td>1 km, 100 m, …</td>
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<tr>
<td>Global Scale</td>
<td>2.5°, 1.0°</td>
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Available data over Atlantic and Africa

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<thead>
<tr>
<th>Dataset Name</th>
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<th>End. Date</th>
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<td>TMI</td>
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<td>Cloud Liquid Water</td>
<td>SSMI</td>
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<td>1997-12-07</td>
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</table>
**Data Distribution**

**Meta-Catalogue:**

Each dataset of the AMMA-SAT database is documented in a meta-catalogue based on the Directory Interchange Format (DIF) developed by the GCMD (Global Change Master Directory). DIF defines a nomenclature to fill metadata and consists of a collection of fields which detail specific information about the data.

**UNIX Logins:**

AMMA-SAT registered users can log on directly to the computers hosting the database. Users can benefit of a personal workspace and have a read-only access to the data to execute their codes.

**Online Catalogue with direct FTP access (ftp.ammasyat.ipsl.polytechnique.fr):**

AMMA-SAT products are accessible directly from the AMMA-SAT FTP site or from the catalogue page of the AMMA-SAT Web site. Public data are delivered through an anonymous FTP access, whereas private data are accessible for registered users only via an identified login access.

**Web Ordering Tool (http://ammasyat.lmd.polytechnique.fr):**

A web ordering tool has been developed to allow users to order data from the database using a multi-criteria search engine.
Future developments

**Research Products:**
- MSG WV (L. Picon)
- MSG/TRMM Precipitation (F. Chopin)
- TMI/SSMI Precipitation (N. Viltard)
- aerosols
- surface
- ...

**Standard Products:**
- TOMS aerosols
- CERES/ERBE radiative fluxes
- Surface fluxes (ocean)
- Surface winds (ocean)
- SST
- MOPITT
- MODIS, NVAP WV
- MSG Cloud Classification