# Common Data Implementation Plan

# COPS, GOP, D-PHASE

*Draft, 19 September 2006*

## Table of Contents

# 1. Introduction

This Data Implementation Plan (DIP) describes the data management and archiving procedures of the interlinked projects COPS, GOP, and D-PHASE.

It serves to

- organize the common data archive of COPS, GOP, and D-PHASE, i.e., to describe the data flow, interfaces, archiving structures, responsibilities and to estimate the overall amount of archived data
- fix data interlinks between modelers and the COPS Operations Center which guides the COPS missions
- organize the data flow for COPS real-time data assimilation

The

- data policy
- links
- responsibilities and contact persons

are specified.

This document is organized as follows: First the common data archive is specified in section 2, then specific points for COPS, GOP, D-PHASE, and the AMF are discussed. The DWD support is described in section 7. It follows the data policy in section 8 and the time line in section 9. Finally, contact persons and abbreviations are listed.

Blue letters mark responsible persons and institutions who coordinate certain tasks as wll as contact persons.

# 2.  Data Archive

The long term data archive for COPS, GOP and D-PHASE is hosted at the World Data Centre for Climate (WDCC) which is run by the group "Model and Data" (M&D) at the Max Planck Institute for Meteorology in Hamburg.

Contact person: Claudia Wunram

## 2.1.  Introduction to WDCC data archive

The two figures below show the homepage of "M&D" and the start page of the download interface of WDCC's data base CERA. An overview of the WDCC data archive is found at the following link: http://cera-www.dkrz.de/CERA/

The user can access the data sets via the webbased interface using several search criteria: the experiment name, the dataset name or the data base code number. A project and experiment description helps to find the required data. Each data set is accompanied by describing meta data information and by the status of the filling process. For downloading large data volumes a batch-mode access is provided.
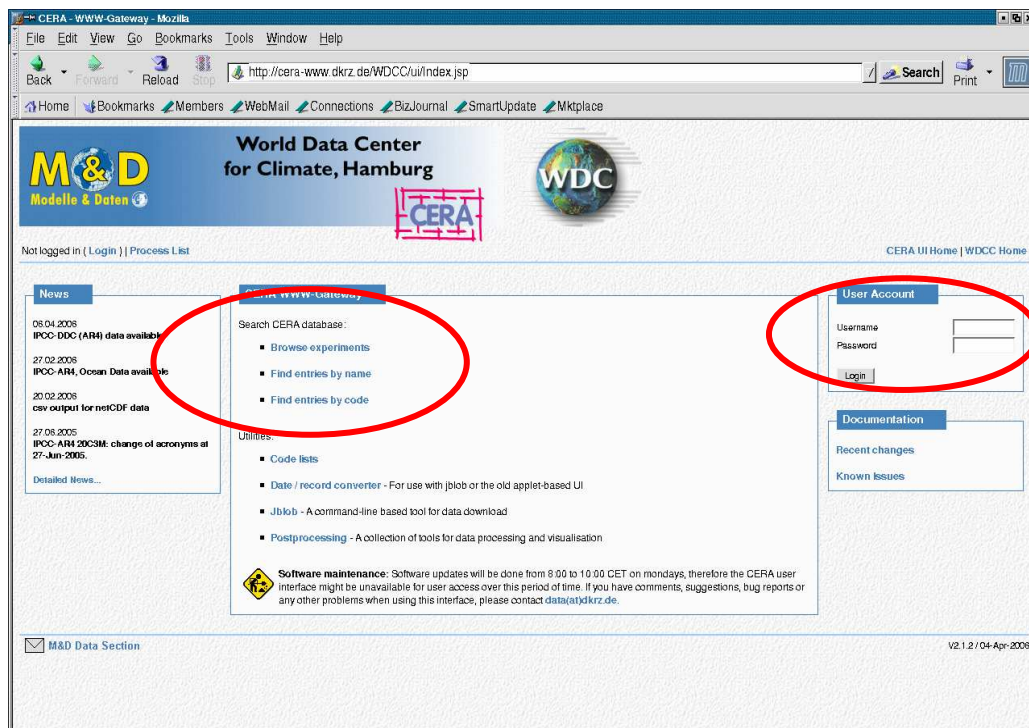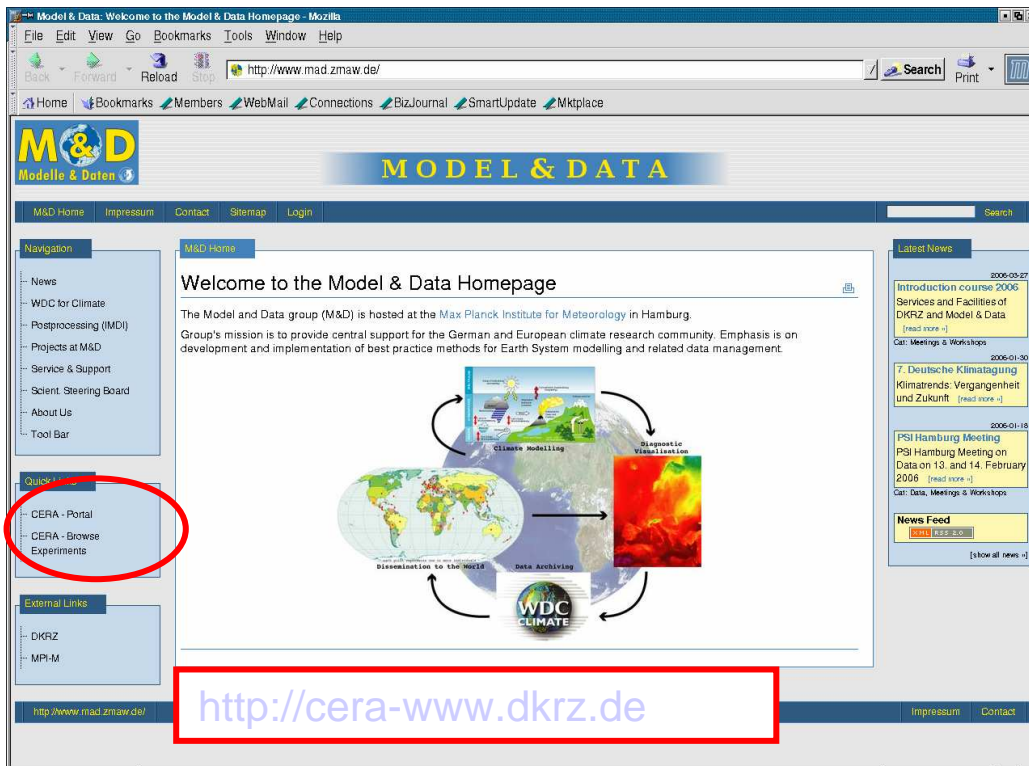
**Fig. 1.** The homepage of "M&D" and the start page of the download interface of WDCC's data base CERA.

## 2.2. Data archive for COPS, GOP and D-PHASE

**Status of data archive**

- In the framework of COPS, GOP, D-PHASE project and the related AMF deployment in the Black Forest, M&D provides storage space on disks and tapes, including their maintenance.

- For the storage the infrastructure of WDCC data base (CERA) is used. M&D offers user support in accessing the CERA data base.

- The manpower for data base layout, management and handling is 50% FTE (full time equivalent) at M&D as funded by DFG within the "COPS & GOP" project.

- Model data, instrument data, quicklooks and alerts will be archived. Details are outlined in the following chapters for each project.

- No real-time aspects of data handling can be done by M&D.

- Meta data layout and meta data implementation of above data is done by M&D.

- Service within the frame of data storage at WDCC is provided by M&D

**Storage amounts:**

- With the present budget, the overall data storage volume (sum for COPS, GOP, and D-PHASE) is 20 TB on tapes (netto, i.e., fully available for data; all data on tapes will be stored twice for backup) and 3 TB on disks; this refers to data storage volume connected to the CERA data base; if additional volume is requested for archiving, additional funding needs to be allocated.

- For visualization tasks in the context of D-PHASE an additional amount of about 500 GB disk space is provided on a work group server at M&D as well as CPU power.

Allocated data volume (draft, with present funding of archive by COP&GOP project):

D-PHASE: 5 TB
GOP: 3+ TB
COPS instruments: 2 TB
COPS models (LMK, MM5/WRF, etc.): 10 TB
Total: 20 TB

Note that the present selection of D-PHASE model output amounts to about 17 TB (also driven by interest of COPS itself, see section 6.1 on TIGGE+). If agreed on this, additional funding is required for the archive.

**Data transfer:**

- Only data which is accompanied by a meta data description in xml-format is accepted by M&D. This refers to model, instrument, quicklooks, and alert data.
- M&D designs a tool for standardized input of meta data and provides it to all data deliverers (models, instruments, quicklooks and alerts). The respective groups have to fill in the required meta data. The xml-output has to be send back to M&D prior to data transfer.
- Each group delivers the data and corresponding meta data to M&D and is responsible for the transfer and the adherence of time limits.
- Instructions for data upload will be provided by M&D.
- For data download the access to the M&D archive is provided via a webbased interface and via batch mode.
- Test runs for data delivery and upload will be performed prior to the start of each project. Each data group will deliver representative test data (\*\*schedule see below).

**Data structure:**

- The COPS, GOP and D-PHASE data have to be delivered in the structure and format, that has been agreed on by M&D in close cooperation with the COPS, GOP and D-PHASE coordinator, respectively.
- The data archive structure will be in accordance with the needs of users, i.e.,
  a) for COPS and D-PHASE so that the download of all measurements and model data of single days (= intensive observation periods, IOPs) is optimized (focus on case studies)
  b) for GOP so that the download of certain data for the full GOP period is optimized (focus on statistics)
- If subregions of model output have to be stored at M&D, then regional data has to be cut out before delivery to M&D (meta data to be included).

Common Data Implementation Plan for COPS, GOP, D-PHASE

**Accepted data formats:**

- netCDF/CF for all instrument data
- GRIB1 or netCDF/CF for all model data (same format for all D-PHASE data)
- standard graphics formats such as jpg, gif, png, eps for all quicklooks (same format for all D-PHASE quicklooks)
- xml-format for meta data description
- If subregions shall be cut out by download from data base, then model data has to be delivered on equidistant grids. No regridding is done by M&D.

**Quality control:**

- The data deliverer is responsible for the quality control of the data and the correct content of the data and meta data files.
- M&D performs no explicit quality control, only general controls are done prior to upload into the data base.

**Data policy, access rights:**

- The common data policy (see section 8) which has been agreed on by all PIs will be respected by M&D
- M&D will give access to the data according to announcements of the COPS coordinator. A user list with the respective access rights will be delivered to M&D by the COPS coordinator.
- User lists for data access comprises the following groups with specific rights for each group:
    - a) COPS, GOP, D-PHASE, ARM scientists (including DWD and all other atmospheric modelers involved in D-PHASE)
    - b) D-PHASE end users (if needed by D-PHASE which is to be clarified, Marco Arpagaus)
    - c) Other external scientists and organizations

# 3. COPS

The COPS Project Office is located at University of Hohenheim.

Contact person: Andreas Behrendt, COPS Coordinator

Contact person COPS-OC: Christian Barthlott

COPS measurement period: 1 June – 31 August 2007.

**General agreements:**

- All COPS data will be archived together with quicklooks (provided by each PI). When data and quicklooks are transferred to M&D, the PIs will add meta data description for both data and quicklook.

- All observational data shall be stored in NetCDF format (prescribed format; if feasible in the same structure as the AMF data for the same types of instruments; consistent during COPS)

- COPS data will be archived as soon as transferred to M&D. In the first stage, the data will be stored on disk.

- The archived COPS data will be transferred from disk to tape in March 2008 after quality checks and intercomparison in its then optimum version together with all previous data releases (if any).Full meta data descriptions are required for each release version.

**Questions/ tasks:**

- To be discussed: The interlink between the web-based data management system organized in the COPS-OC and the real-time visualizations within D-PHASE and COPS & GOP quicklooks (Cristian Barthlott, Claudia Wunram, Marco Arpagaus, Mario Mech).

- TBD: LMK with high resolution

- Declare expected data volume for
  - ETReC07 requirements? (Andreas Behrendt)
  - PQP requirements? (Andreas Behrendt)

- Links to EUMETSAT, 3D radar data of DWD will be included in data base, granularity and remote entry level has to be discussed.

- Amount of measured data in NetCDF? For the time being, 3 TB are allocated for COPS.
- NinJo will be used for mission planning (Christian Barthlott, Andreas Behrendt)
- implement POLDIRAD, Karlsruhe radar, Mantancy in NinJo via BUFR (Christian Barthlott with PIs)
- Time requirements for real-time data assimilation via GTS/AFD (Contact: Thomas Hanisch, DWD)
- NWP products generated in batch mode (i.e., not interactively) with Ninjo will be required for the COPS-OC and MAP D-PHASE. The list of products needs be defined; will probably be similar to products defined in the MAP IP. (Christian Barthlott, Marco Arpagaus)

**Note:**
- NinJo 1.3 will be available from March 2007

Figures 1 to 3 show the data flow for real-time data assimilation and for non-real-time applications during COPS, respectively.

For **real-time data assimilation**, (Fig. 2)

a) additional **standard meteorological data** measured during COPS will be transferred via the Global Telecommunication System (GTS) to the modelers. Here BUFR format or FM code are required (Fig. 3). The format is provided by PIs with support of DWD, contact: Sibylle Krebber; if helpful: a workshop/manual can be organized to help with data formats. This procedure is applicable to the following instruments:
- radiosonde data
- weather stations
- GPS (?)
- others?

b) non-standard meteorological data of research instruments which is available in real-time will be transferred/made available directly to selected modelers. The format of these data will be organized by the involved groups. This is applicable for the following instruments:
- water vapor lidar data (DLR DIAL, LEANDREII, UHOH Scanning WV DIAL, others?)
- GPS slant path?
- Others? (wind profiler, sodars?)

Note that no real-time data management of M&D is available. If required, also for COPS measurement data like for D-PHASE model data a disk volume at M&D can be installed.
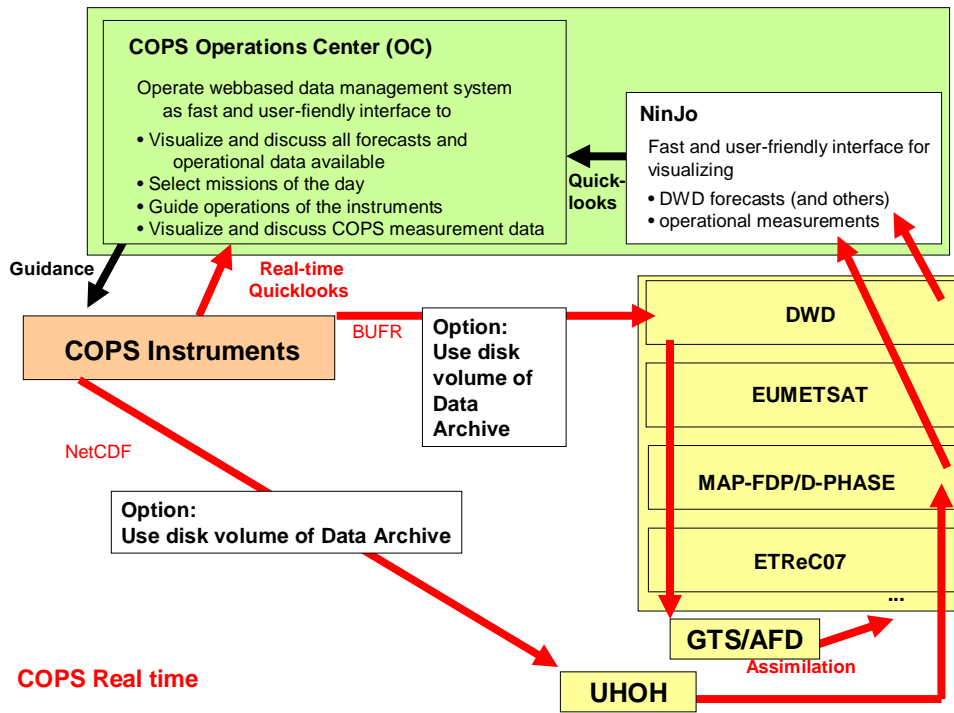


**Fig. 2.** Data links for real-time data assimilation during COPS.
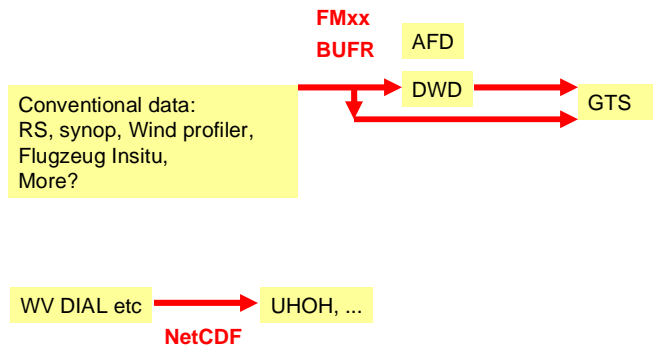


**Fig. 3.** Different types of data during COPS for real-time data assimilation: (a) conventional data in BUFR or FM code (b) data of research instruments, e.g., the DLR water vapor DIAL will be provided in NetCDF and assimilated at University of Hohenheim (UHOH)

For **non-real-time data handling**, measurement data, model data and special visualizations like made with NinJo at the COPS-OC are transferred to the Data Archive at M&D (Fig. 4). The data and quicklooks are available for mission planning.

Common Data Implementation Plan for COPS, GOP, D-PHASE
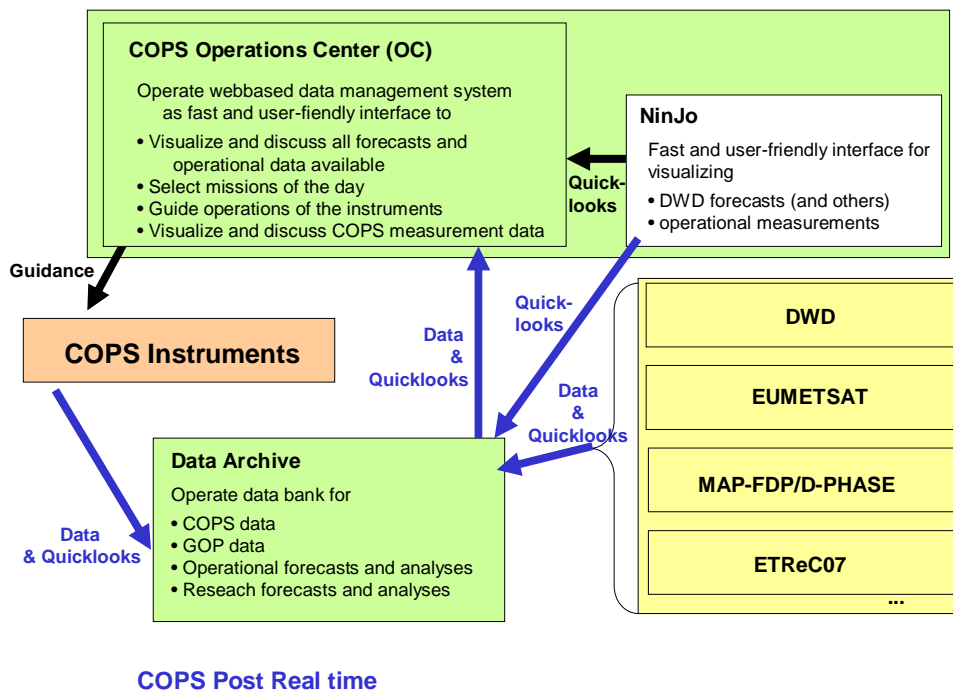
**Fig. 4.** Data links in non-real time during COPS.

# 4. GOP

The GOP is coordinated at University of Cologne.

Contact person: Mario Mech, GOP Coordinator

Period: 1 January – 31 December 2007.

**General agreements:**

- Visualization products and meta data will be provided by GOP PIs/ GOP Coordinator
- Test run will be performed in autumn 2006.

**Notes:**

- 3D reflectivity of DWD radar available in BUFR from autumn 2006 on, contact Hans-Joachim Koppert, Theo Mamm, include French & Swiss radars; include Karlsruhe and Bonn radar; Doppler data? (Susanne Crewell, Mario Mech)

**Questions/ tasks:**

- Specify GOP data management requirements , Susanne Crewell, Mario Mech
- Specify amount of measured data (in NetCDF)

Fig. 5 shows the data links for GOP data. The GOP data are transferred to the Data Archive where they are also available for COPS Mission Planning.
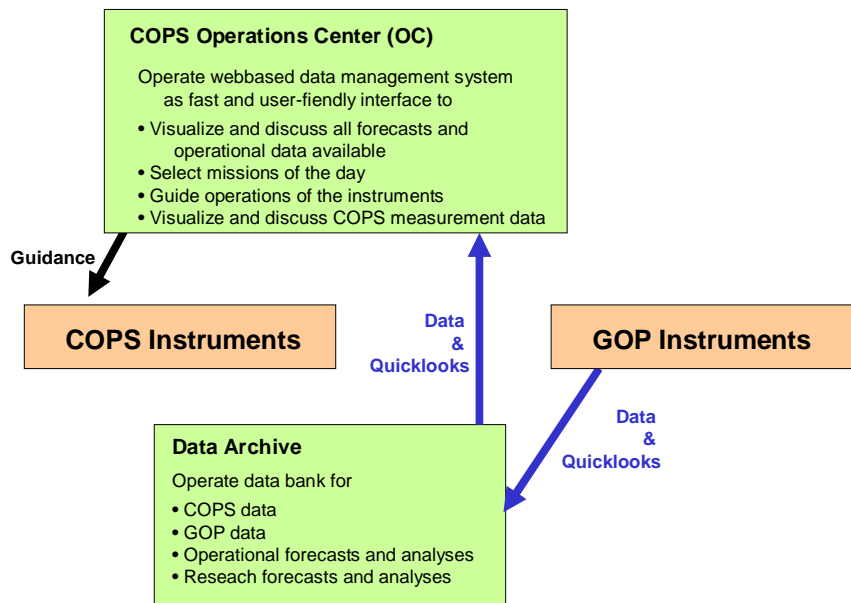


**Fig. 5.** Data links for GOP data.

# 5.  AMF

Measurement period: 1 April – 31 December 2007

**General agreements:**

- AMF Data are archived at ARM Data Archive (DOE) and available online.
- To be clarified: All AMF data will be transferred to M&D archive at end of the measurement period to ease the user access. M&D delivers logfiles of user access to ARM in order to meet the ARM policy.
- Data policy of both data archives will be accepted from both sides (rights of data originators are maintained, no premature access allowed).

**Notes:**

- Meeting on AMF data management was held on 22 May 2006, Uni Hohenheim

**Questions/ tasks:**

- Real-time assimilation of radiosondes and other data via GTS

# 6. D-PHASE

Contact person: Marco Arpagaus, MAP D-PHASE Coordinator

Period: 1 June – 30 November 2007.

**General agreements:**

- Model data, quicklooks, alerts, and feedbacks are archived at M&D on tapes.

- The real-time Data Interface cannot be hosted by M&D.

- Producing and handling alerts is done by each model group

- Visualization: Near real-time for D-PHASE and COPS mission planning

- Visualization software is provided by COPS (= FZK, UHOH?), three possible procedures:

  a) quicklooks are produced by each model group on CPU and disk space provided by M&D

  b) quicklooks are produced by COPS (= FZK, UHOH?) on CPU and disk space provided by M&D

  c) quicklooks are produced externally by each modeling group and transferred to M&D with the data including meta data

- If subregions shall be cut out by M&D prior to download from data base, then model data has to be delivered on equidistant grids. If this is needed for all model data, then the same grid is necessary. No regridding is done by M&D.

**Notes:**

- D-PHASE Meeting 6 – 8 November 2006, Vienna

- Test-run: 26.2 – 2.3.2007

- The MAP D-PHASE Implementation Plan can be downloaded from http://www.map.meteoswiss.ch/map-doc/dphase/dphase_documents.htm.

**Questions/ tasks:**

- Specify D-PHASE data management requirements real-time/non-real-time, Marco Arpagaus

  - Real-time (within 30 minutes of data delivery on data archive):

    a) Production of quicklooks for atmospheric models (cf. COPS section, too)

    b) Visualisation of quicklooks (use of data management system; to be discussed with Christian Barthlott)

- Non-real-time:
  a) Storage of all data, quicklooks, alerts, and feedbacks
- Is it possible to merge the output of the different D-PHASE models to an ensemble? (Contact: Michael Denhard, DWD)
- Program for visualizations (Christian Barthlott? UHOH?)
- Visualization: Additional plots of LMK (and others? aLMo, AROME, MM5?) with NinJo for mission planning which will also be archived Christian Barthlott

Details of the data links of D-PHASE, the COPS-OC and the Data Archive are shown in Fig. 6.

Details of the internal D-PHASE data interlinks between modelers and hydrologists can be found in the MAP D-PHASE Implementation Plan.
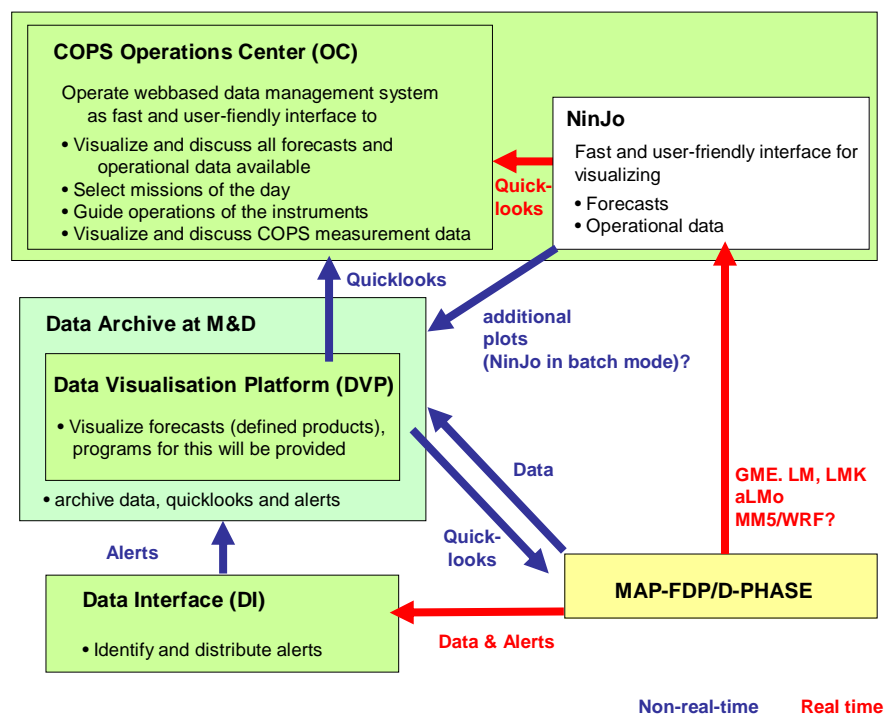


**Fig. 6.** Details of data links required for MAP D-PHASE.

## 6.1. TIGGE+

The selection of D-PHASE data which is archived was performed in such a way that the stored data are compatible with TIGGE. As TIGGE was designed for global and not for mesoscale models, we will extend the archived data in space and time and select also additional variables which are of special interest in the frame of D-PHASE and COPS.

Common Data Implementation Plan for COPS, GOP, D-PHASE

**General agreements:**

- Data format: GRIB1.

- Specification of GRIB output for atmospheric models will be provided by Andrea Montani (D-PHASE WG-DI chair)


**TIGGE+ list of variables to be stored (Status 2 August 2006)**

**Notes and colour / formatting codes:**

ens: ensembles

inst: instantaneous output

det_lo: determined over period from last output time to current output time

acc_st: accumulated over period from start of forecast to current output time (or alternatively accumulated from last output time to current output time; to be decided)


Black: Variables on TIGGE list

Blue: Variables from TIGGE list that are ignored

&ndash; potential vorticity on Theta = 340 K

&ndash; potential temperature on 2 PVU

&ndash; U-velocity on 2 PVU

&ndash; V-velocity on 2 PVU

&ndash; geopotental height at 50 hPa

Green: Variables on TIGGE list that are replaced

&ndash; 2m Td by 2m q

&ndash; Surface solar radiation by its components (incoming and outgoing)

&ndash; Surface thermal radiation by its components (incoming and outgoing)

Red: Variables that are added to the TIGGE list

&ndash; on request by WG-VER & COPS

&ndash; *on request by COPS, only*

*Note: COPS would like to have an even higher output frequency for all variables, e.g. 15 or 30 minutes instead of 1h.*

## Single level fields

| Parameter | Output frequency | Accumulation |
|---|---|---|
| Pressure at mean sea level | 1h (3h for ens) | inst |
| Pressure at the surface | 1h (3h for ens) | inst |
| 2m air temperature | 1h (3h for ens) | inst |
| 2m air min temperature | 1h (3h for ens) | det_lo |
| 2m air max temperature | 1h (3h for ens) | det_lo |
| 2m specific humidity | 1h (3h for ens) | inst |
| 10m U-velocity | 1h (3h for ens) | inst |
| 10m V-velocity | 1h (3h for ens) | inst |
| Total precipitation (liquid+frozen) | 1h (3h for ens) | acc_st |
| Total precipitation: convective only | 1h (3h for ens) | acc_st |
| Total precipitation: grid-scale only | 1h (3h for ens) | acc_st |
| Snow fall | 1h (3h for ens) | acc_st |
| Total column water | 1h (3h for ens) | inst |
| Total column water vapour (integrated water vapour) | 1h (3h for ens) | inst |
| Total column liquid water (liquid water content) | 1h (3h for ens) | inst |
| Total column ice water (ice water content) | 1h (3h for ens) | inst |
| Total cloud cover | 1h (3h for ens) | inst |
| Cloud top height | 1h (3h for ens) | inst |
| Cloud bottom height | 1h (3h for ens) | inst |
| Surface latent heat flux | 1h | acc_st |
| Surface sensible heat flux | 1h | acc_st |
| Surface short wave radiation (incoming) | 1h | acc_st |
| Surface short wave radiation (outgoing) | 1h | acc_st |
| Surface long wave radiation (incoming) | 1h | acc_st |
| Surface long wave radiation (outgoing) | 1h | acc_st |
| Outgoing long wave radiation (model top) | 1h | inst |
| Skin temperature | 1h | inst |
| Sunshine duration | 1h | acc_st |
| Convective available potential energy | 1h | inst |
| Convective Inhibition | 1h | inst |
| Snow depth | 1h | inst |
| Soil moisture (all layers) | 1h | inst |
| Soil temperature (all layers) | 1h | inst |
| Orography (Geopotential at the surface) | once | |
| Land-sea mask | once | |
| Vegetation type | once | |
| Soil type | once | |
| Plant cover | daily | |
| Leaf area index | daily | |
| Root depth | daily | |

Common Data Implementation Plan for COPS, GOP, D-PHASE

| Parameter | Output frequency | Accumulation |
|---|---|---|
|  |  |  |
| 2m air temperature ens mean | 3h for ens | inst |
| 2m specific humidity ens mean | 3h for ens | inst |
| Total precipitation ens mean | 3h for ens | acc_st |

**Total number of 2d fields (assuming 3 soil layers):**

– deterministic models (all): 37 (hourly) + 7 (once/daily)

– ensembles (all): 22 (3-hourly) + 7 (once/daily)

*Upper air fields*

at (9) pressure levels 1000, 925, 850, 700, 500, 300, 250, 200, *100* hPa (all models) and at all model levels (typical: 30) below 4000m above msl (high-resolution deterministic models only) and a*t all model levels (typical: 60) in COPS domain (high-resolution deterministic models and 1.6-31.8.2007 only)*

| Parameter | Output frequency | Accumulation |
|---|---|---|
| Temperature | 1h (3h ens) | inst |
| Geopotential | 1h (3h ens) | inst |
| U-velocity | 1h (3h ens) | inst |
| V-velocity | 1h (3h ens) | inst |
| W-velocity | 1h (3h ens) | inst |
| Specific Humidity | 1h (3h ens) | inst |
|  |  |  |
| *Cloud water (COPS domain only)* | *1h* | *inst* |
| *Cloud ice (COPS domain only)* | *1h* | *inst* |
| *Rain (COPS domain only)* | *1h* | *inst* |
| *Snow (COPS domain only)* | *1h* | *inst* |
| *Graupel (COPS domain only)* | *1h* | *inst* |

**Total number of 2d fields:**

– deterministic models (high-resolution): (9+30) * 6 = 234, hourly

– deterministic models (high-resolution; COPS domain only): (9+60) * 11 = 759, hourly

– deterministic models (driving models): (9) * 6 = 54, hourly

– ensembles (all): (9) * 6 = 54, 3-hourly

**Questions/tasks:**

- is the 100 hPa level still required as we have the high-resolution data in the COPS domain anyway?
- Archiving of all 30' oder 15'? Is the required additional funding of tapes available?
- Note that there is no station output in the list (NetCDF format within GOP)

# 7. DWD support and products

**General agreements:**

- for GOP &D-PHASE; "station output" for GOP & COPS sites + additional products transferred to Data Archive. The model regions corresponding to the station sites are cut out by DWD before delivery to M&D.

**Notes:**

- invite forecasters to participate in COPS!
- All start files are anyway archived at DWD
- Contact person: Christian Koziar

**Questions/ tasks:**

- During COPS: full LMK during COPS, or only COPS-IOPs (30 days?) or at least full LMK in COPS area (amount of data?)
- Long-time archiving of full LMK during COPS at DWD?

## 7.1. DWD Forecast data which are stored for the DFG Priority Program PQP

For LMK, additional new products shall be defined in accordance with COPS/GOP.
Christian Koziar will send list of LMK data products to COPS, GOP, D-PHASE as soon as available. *Done, available at http://www.uni-hohenheim.de/spp-iop/documents/lmk.pdf*

The archiving of LM/LME data will be continued at DWD.

### 7.1.1. Description of long-time-archived LM/LME data

(to be translated)

**Zeitraum:**

gesamter SPP-Zeitraum (Beginn bei aeltester vorhandener

Routine-LM-Vorhersage = 13.01.2004, 00UTC bis Ende SPP = 31.03.2010)


**Daten:**

Routine-Vorhersagen des LM, jeweils vom 00UTC- und 12UTC-Lauf (vom

13.01.2004, 00UTC bis 31.10.2005, 12UTC)

bzw. Routine-Vorhersagen des LME, jeweils vom 00UTC- und 12UTC-Lauf (ab

16.08.2005, 00UTC)

Zeitliche Auflösung: 1 h

Zeitliche Vorhersagedauer je Lauf: 48 h

 (fuer die Zeit der Umstellung von LM auf LME sind fuer eine gewisse Uebergangszeit

Vorhersagen beider Modelle parallel verfuegbar, um Studien hinsichtlich evtl. systematischer

Unterschiede zwischen beiden Modellversionen zu ermoeglichen)


**Domain:**

gesamtes LM-Modellgebiet bzw. Ausschnitt des LME-Modellgebietes, der dem LM-Modellgebiet entspricht (nicht 100%-ig identisch, weil die Koordinaten-Nordpole der Modellgitter verschieden sind)


**Vorhersagelaenge:**

LM:  0h ... 48h, Intervall: 1h

LME: 0h ... 78h, Intervall: 1h


**Parameter:**

 (im folgenden bedeutet "auf p-Flaechen", das der jeweilige Modellparameter "auf 1000 + 950 + 850 + 700 + 600 + 500 + 400 + 300 hPa" archiviert wird)


**Felder auf p-Flächen:**

FI:     Geopotential [m²/s²]

U:      Zonaler Wind [m/s]

V:      Meridionaler Wind [m/s]

T:      Temperatur [K]

OMEGA:    Vertikalbewegung [Pa/s]

RELHUM:   Relative Feuchte [%]


**Ein-Flaechen-Felder:**

FIS:       Geopotential der Erdoberflaeche [m²/s²]

PS:        Unreduzierter Bodendruck [Pa]

PMSL:      auf NN reduzierter Bodendruck

CAPE_CON: konvektiv verfuegbare potentielle Energie [J/kg]

CLCT:      Gesamtbedeckungsgrad mit Wolken [%]

CLCH:      Bedeckungsgrad mit hohen Wolken (0-400hPa) [%]

CLCM:      Bedeckungsgrad mit mittelhohen Wolken (400-800hPa) [%]

CLCL:      Bedeckungsgrad mit niedrigen Wolken (800hPa-Boden) [%]

TOT_PREC: Gesamtniederschlag [kg/m²]

RAIN_GSP: Skaliger Regen [kg/m²]

RAIN_CON: Konvektiver Regen [kg/m²]

SNOW_CON: Konvektiver Schnee [kg/m²]

SNOW_GSP: Skaliger Schnee [kg/m²]

W_SNOW:   Wassergehalt der Schneedecke [kg/m²]

TWATER:   Vertikal integriertes Wasser [kg/m²]

TQV:       vertikal integrierter Wasserdampf [kg/m²]

TQC:       vertikal integriertes Wolkenwasser [kg/m²]

TQI:       vertikal integriertes Wolkeneis [kg/m²]

QV_S:      Spezifische Feuchte an der Oberflaeche [kg/kg]

T_2M:      2m-Temperatur [K]

TD_2M:     2m-Taupunkt [K]

TMAX_2M:  Maximum der 2m-Temperatur [K]

TMIN_2M:  Minimum der 2m-Temperatur [K]

ASHFL_S: fuehlbarer Waermefluss an der Oberflaeche [W/m²]

ALHFL_S: latenter Waermefluss [W/m²]

HBAS_CON: Hoehe der Basis konvektiver Wolken ueber NN [m]

HTOP_CON: Hoehe der Obergrenze konvektiver Wolken ueber NN [m]

U_10M:    Zonaler 10m-Wind [m/s]

V_10M:    Meridionaler 10m-Wind [m/s]

VMAX_10M: Maximum der 10m-Windgeschwindigkeit [m/s]


Fuer den Zeitraum ab dem 01.01.2005 werden auf Wunsch von Christian Keil vom DLR Oberpfaffenhofen zusaetzlich zu den oben aufgefuehrten LM/LME-Ausgabeparametern noch die Strahlungstemperaturfelder fuer METEOSAT 7 und METEOSAT 8 aus dem Komplex der synthetisch generierten Satellitenbilder archiviert. Damit sind folgende GRIB-Felder gemeint:

'Cloudy brightness temperature' (ipds(41)=1) fuer METEOSAT 7 (tab=205, ee=3, 'SYNME7') und METEOSAT 8 (MSG, tab=205, ee=4, 'SYNMSG'); d.h. METEOSAT-7 mit Instrument MVIRI: WV6.4 + IR11.5 und MSG mit Instrument SEVIRI: IR3.9 + WV6.2 + WV7.3 + IR8.7 + IR9.7 + IR10.8 + IR12.1 + IR13.4

**Gesamtdatenvolumen pro Vorhersage:**

LM  (48h):  798 344 804 Byte(s) (ohne synthetische Satellitenbilder)

LM  (48h):  901 998 424 Byte(s) (mit synthetischen Satellitenbildern)

LME (78h): 1 526 619 796 Byte(s)

(zum Vergleich: kompletter LM-Output:

5.1 GB, kompletter LME-Output: 37.3 GB)


### 7.1.2. Description of long-time-archived LMK data


Needs to be specified.

Available LMK data see *http://www.uni-hohenheim.de/spp-iop/documents/lmk.pdf*

# 8. Data policy

1. All investigators participating in COPS, GOP, and D-PHASE must agree to **promptly submit their data** to the joint Data Archive to facilitate the intercomparison of results, quality control checks and inter-calibrations, as well as an integrated interpretation of the combined data set (up to end of phase 2 of PQP, i.e., up to March 2008, the latest).

2. All data shall be **promptly provided to other COPS, GOP or D-PHASE investigators** upon request. A list of investigators will be maintained by the COPS Project Office at University of Hohenheim and will include the principle investigators directly participating in the field experiment as well as collaborating scientists who have provided guidance in the planning of COPS/GOP activities.

3. During the initial data analysis period (up to end of phase 2 of PQP, i.e., **up to March 2008), no data may be provided to a third party** (journal articles, presentations, research proposals, other investigators) without the consent of the investigator who collected the data. This initial analysis period is designed to provide an opportunity to quality-control the combined data set as well as to provide the investigators time to publish their results.

4. All data will be considered **community domain for all COPS/GOP/D-PHASE investigators and PIs of PQP after March 2008** and any use of the data will offer co-authorship at the discretion of the investigator who collected the data.

5. After the end of phase 3 of PQP, i.e., **March 2010, all data will be considered public domain**. In this phase, any use of the data will include either acknowledgment (i.e., citation) or offer co-authorship at the discretion of the investigator who collected the data.

6. **Commercial use of the data is prohibited, the data may be used for research only.**

*ICSU rules?*

# 9. Time line

**Meetings:**

- Data implementation meeting 26-27.04.06 in Offenbach
- 4th COPS Workshop, 25/26 September 2006, Hohenheim
- 5th COPS Workshop, March 2007, Hohenheim

**Deadlines:**

- Agreement on data archive content and storage intervals with respect to assimilation (real time) and to data analysis (**June 2006** because of HW acquisition) → *done*
- Acquisition and installation of hard ware resources **(September 2006)**
- Definition of COPS, GOP, D-PHASE data structure and data flows: what are the interfaces and who are the responsible persons? Definition of fall back scenario(s) **(September 2006)**
- Agreement on WDCC data interface for measurements and for model data **(September 2006)**
- Integration of COPS/GOP/D-PHASE data policy **(December 2006)**
- Implementation of prototype for COPS data flows and test cases and integration of GOP finished **(December 2006 the latest)**
- Implementation of prototype for D-PHASE data flows and test cases **(February 2007 the latest; dry run 26.2 – 2.3.2007)**
- Test and improvement of COPS and D-PHASE data (archive) flows **(finished until June 2007)**

# 10. List of contact persons with responsibility

Name, Institution, (needs to be translated to English, telephone & email to be added)

Felix Ament, Uni Bonn, Representative of GOP at Meeting in Offenbach

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Matthias Gzeschik, University of Hohenheim, Datenassimilation mit MM5/WRF von COPS-Daten

Hans-Joachim Koppert, Leiter NinJo, DWD

Christian Koziar, DWD, Coordination of  and SPP1167 + Niederschlagsdaten Radar für GOP

Sybille Krebber, Vertreterin Technische Infrastruktur DWD, BUFR, GRIB, Archivierung

Detlef Majewski, DWD

Armin Mathes, Uni Bonn, Koordinator SPP1167 + Niederschlagsdaten Rain Gauges für GOP

Christoph Schraff, LM/LMK-Datenassimilation, DWD

Hannes Thiemann, ICSU WDCC Model & Data Group, Management of Data Archive for COPS/GOP/D-PHASE

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# 11. List of Abbreviations

(to be continued)


AFD

AMF          ARM Mobile Facility

ARM          Atmospheric Radiation Measurement (ARM) Program; created in 1989 with
             funding from the U.S. Department of Energy (DOE).

BUFR         Binary Universal Form for the Representation of meteorological data

CERA         Climate and Environmental data Retrieval and Archiving

COPS         Convective and Orographically-induced Precipitation Study

COPS-OC      COPS Operation Center

DKRZ         German High Performance Computing Centre for Climate- and Earth System
             Research

D-PHASE      Demonstration of Probabilistic Hydrological and Atmospheric Simulation of
             flood Events in the Alpine region

FM

GOP          General Observation Period

GTS

M&D          Model and Data Group at Max-Planck-Institute for Meteorology, Hamburg

MAP          Mesoscale Alpine Programme

MAP-IP       MAP Implementation Plan

NetCDF       network Common Data Form

NinJo        High performance meteorological visualization programme

PIs          Principle Investigators

PQP          Praecipitationis Quantitativae Praedictio/Quantitative Precipitation Forecast

TIGGE        THORPEX Interactive Grand Global Ensemble

WDCC         World Data Center for Climate