



Joint D-PHASE - COPS data set (JDC data set)

Technical description

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1. Introduction

In February 2007 a joint activity of the WWRP projects D-PHASE (Rotach et al., 2009) and COPS (Wulfmeyer et al., 2008) has been started to collect data from the national and regional weather services of Central Europe for the verification of NWP-models and process studies. This covers data provided via the GTS as well as from other networks for the whole year 2007 including the COPS measurement period (June – August 2007) and the DOP of D-PHASE (June – November 2007). The Department of Meteorology and Geophysics of the University of Vienna took over the responsibility for this activity.

2. Data provider

The national and regional weather services in Central Europe have been contacted by the chairmen of the MAP D-PHASE SC and COPS ISSC to provide their GTS and non-GTS data of the year 2007 in support of the respective WWRP projects. All weather services agreed to provide their data under the roof of the MAP data access policy (<http://www.map.meteoswiss.ch/map-doc/DataAccessPolicy.htm>). The participating weather services are listed in table 1.

Some notes on data delivery and manipulation:

- None of the data have been changed at the University of Vienna, no quality control or other data manipulation has been performed. The data have been collected, their formatting has been harmonized and they have been uploaded to the DA.
- We received the GTS-data via the Austrian Meteorological Service ZAMG. Due to bilateral agreements this data set may also contain data which would not have been defined as GTS in other cases. Therefore the terming GTS and non-GTS is not strict.
- It may be possible that data have been delivered as GTS data as well as non-GTS data. We did not search for and remove these doublets.
- It is usual that a station reporting GTS data reports non-GTS data also and therefore appears in both type of station lists.

Country	Weather Service (data owner)
Austria	Zentralanstalt für Meteorologie und Geodynamik (ZAMG) Austro Control GmbH (ACG) Bundesministerium für Land- und Forstwirtschaft UBIMET GmbH
Belgium	Royal Meteorological Institute (RMI)
Bosnia and Herzegovina	Federal Hydrometeorological Institute (METEOBIH)
Croatia	Meteorological and Hydrological Service of Croatia (DHZ)
Czech Republic	Czech Hydrometeorological Institute (CHMI)
France	Meteo France
Germany	Deutscher Wetterdienst (DWD) Landesanstalt für Umwelt, Messungen und Naturschutz Baden-Württemberg (LUBW) Bayerisches Landesamt für Umwelt
Hungary	Hungarian Meteorological Service (OMSZ)
Luxembourg	Service Meteorologique de l'Administration de l'aéroport de Luxembourg
The Netherlands	Royal Netherlands Meteorological Institute (KNMI)
Poland	Institute of Meteorology and Water Management (IMGW)
Switzerland	MeteoSwiss
Italy	<ul style="list-style-type: none"> • Aeronautica Militare • ARPA Veneto • ARPA Piemonte • ARPA-SIMC (Emilia Romagna) • Centro Funzionale per la Meteorologia, l'idrologia e la Sismologia –Regione Marche • Dipartimento Protezione Civile e Tutela del Territorio Ufficio Previsioni e Organizzazione (Trento) • ARPAL-CFMI-PC (Liguria) • ARPA Lombardia • OSMER (Friuli-Venezia-Giulia) • Regione Autonoma Valle d'Aosta – Ufficio Meteorologico • Ufficio Idrografico – Provincia Autonoma di Bolzano / Hydrographisches Amt – Autonome Provinz Bozen

	• Consorzio LaMMA – CNR, Regione Toscana
Slovakia	Slovak Hydrometeorological Institute (SHMU)
Slovenia	Environmental Agency of the Republic of Slovenia
United Kingdom	UK MetOffice

Table 1: National and regional weather services providing data for the JDC data set.

3. Stored parameters and format

Surface data provided via GTS are coded in the international FM12 SYNOP form. FM12 SYNOP code consists of 7 sections (section 0 to section 6) each of them comprises several parameters. However, only a subset of the sections contains data. Non-GTS surface data have been received in many different formats and number of parameters throughout Central Europe.

It is therefore useful to define a common subset of parameters to be stored (table 2+3). The term “code number” in table 2 refers to the WMO SYNOP code table number for the parameter in view. The WMO Manual of Codes including the code table numbers can be found at <http://www.wmo.ch/pages/prog/www/WMOCodes/ManualCodesGuides.html>.

If a certain parameter is not available from the specific station the value is set to -9990. It is the intention to have just one harmonized format for all type of networks which eases the data access. Multiplying the respective values by ten allows for handling with integer values only (see table 2 for scale factor). The great variety of accumulation periods of precipitation for non GTS-data enforced an extension of the WMO code table 4019 (see table 3).

Data from more than 1000 GTS stations and from more than 11000 non-GTS stations have been collected and processed. Figure 1 shows the data coverage over Central Europe. The accumulation periods of precipitation for non-GTS data differ from weather service to weather service (see Figure 2). To allow for a homogenous data set of highest possible station density for precipitation, accumulation periods of shorter than 1 hour have been summed up to 1h, 3h, 6h, 12h and 24h periods. This task has been performed at the University of Hohenheim and partly at the University of Vienna.

NetCDF variable name	NetCDF long name	Unit	WMO Code Table Number	scale factor
visibility in air	VV	code number	4377	---
wind from direction	dd	Degree	---	---
wind speed	ff	m/s	---	0,1
air temperature	T	K	---	0,1
dew-point temperature	Td	K	---	0,1
minimum of air temperature	Tmin	K	---	0,1
maximum of air temperature	Tmax	K	---	0,1
air pressure at station level	Pstat	Pa	---	---
air pressure at sea level	Psl	Pa	---	---
tendency of air pressure	ppp	Pa/3h	---	---
form of pressure trace	a	code number	0200	---
precipitation rate	RR	mm/xh (xmin)	---	0,1
accumulation period for prec. rate ⁽¹⁾	tRR	code number	4019	---
present weather	ww	code number	4677	---
most significant weather	W1	code number	4561	---
second most significant weather	W2	code number	4561	---
total cloud cover	N	code number	2700	---
cloud cover for low clouds	Nh	code number	2700	---
cloud base altitude	h	code number	1600	---
cloud type of low clouds	Cl	code number	0513	---
cloud type of medium clouds	Cm	code number	0515	---
cloud type of high clouds	Ch	code number	0509	---
wind speed of gust ⁽²⁾	Fxx	m/s	---	0,1

Table 2: Selected parameters stored, WMO code table number refers to WMO, 1995.

⁽¹⁾ accumulation period of precipitation ending with the observation time. The WMO code table has been extended to allow for shorter accumulation periods. The extended table for tRR is given in table 3. ⁽²⁾ according to WMO code table number 3778 report, 911ff has been used for wind speed of gust.

tRR =	1	Accumulated precipitation during 6 hours preceding the observation
tRR =	2	Accumulated precipitation during 12 hours preceding the observation
tRR =	3	Accumulated precipitation during 18 hours preceding the observation
tRR =	4	Accumulated precipitation during 24 hours preceding the observation
tRR =	5	Accumulated precipitation during 1 hour or 30 min preceding the observation
tRR =	6	Accumulated precipitation during 2 hours preceding the observation
tRR =	7	Accumulated precipitation during 3 hours preceding the observation
tRR =	8	Accumulated precipitation during 9 hours preceding the observation
tRR =	9	Accumulated precipitation during 15 hours preceding the observation
tRR =	10	Accumulated precipitation during 10 minutes preceding the observation
tRR =	11	Accumulated precipitation during 5 minutes preceding the observation
tRR =	12	Accumulated precipitation during 6 minutes preceding the observation
tRR =	15	Accumulated precipitation during 15 minutes preceding the observation

Table 3: WMO code table number 4019 with extensions for 10, 5, 6 and 15 minutes accumulation periods.

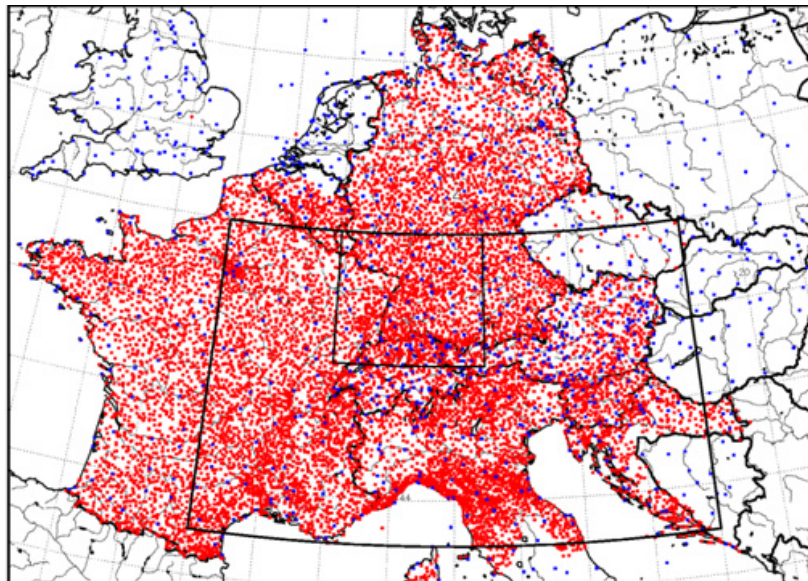


Figure 1: GTS (blue) and non-GTS (red) station distribution. Data from these stations have been collected for the whole year 2007 (partly only for the period 6-11/2007). Smaller frame – COPS area, larger frame – D-PHASE area.

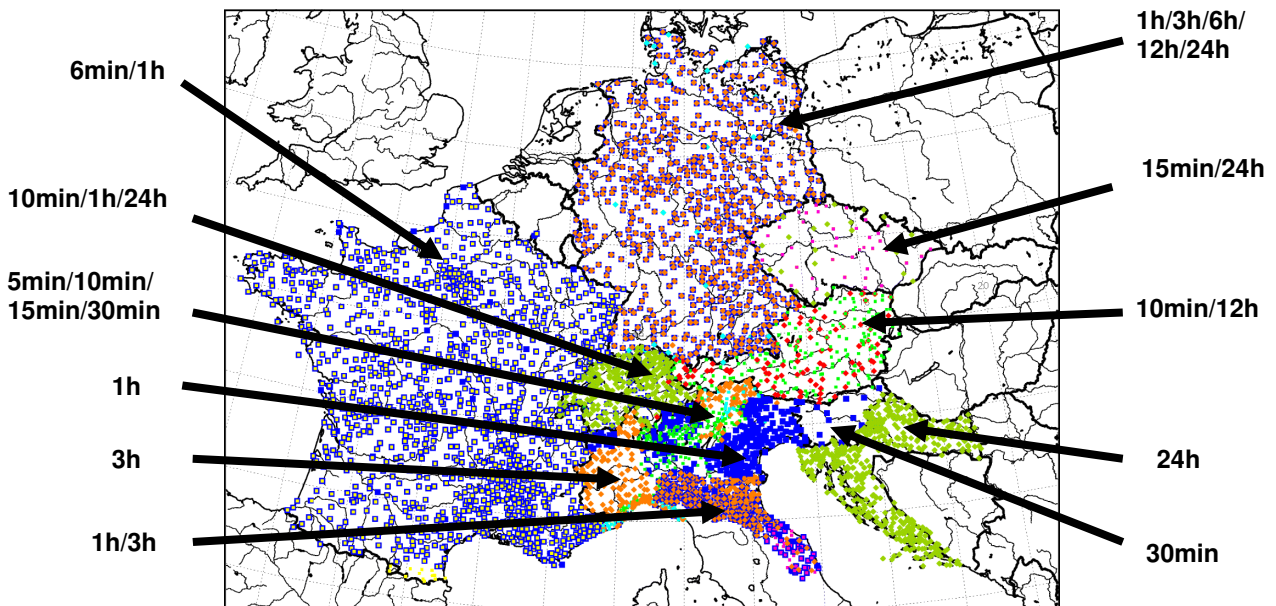


Figure 2: Accumulation periods of precipitation (non-GTS).

Several types of stations lists have been compiled to give the user a maximum on information about the JDC data set. These lists are summarized in the zipped-file *JDC_station_lists*. All of the different statlist-files start with the following information:

```
station_counter WMO_station_number(or internal institution number for non-gts stations)
station_name latitude longitude pressure_sensor_height station_height
data_provider_code country_code
```

e.g. for the Austrian station wien/Hohe warte

```
693 11035 WIEN/HOHE WARTE 48.25000 16.37000 200 195 ZAMG AT
```

All in all, eight different statlist-files are provided:

```
statlist_gts_synop_params.txt or statlist_non-gts_synop_params.txt
statlist_gts_synop_times.txt or statlist_non-gts_synop_times.txt
statlist_gts_rr_params.txt or statlist_non-gts_rr_params.txt
statlist_gts_rr_times.txt or statlist_non-gts_rr_times.txt
```

They are divided in station lists for GTS data and non-GTS data. The “params”-file describe whether the meteorological parameters have been reported for each station (“1” for yes, “0” for no) and the accumulation period of the original precipitation report (for the “synop”-files) or for the summed up precipitation data to 1h, 3h, 6h, 12h and 24h (for the “rr”-files).

e.g. for the Austrian station wien/Hohe warte

```
693 11035 WIEN/HOHE WARTE 48.25000 16.37000 200 195 ZAMG AT 111111 110110000
```

111111 stands for parameters: wind_direction, wind_speed, temperature, dew point, pressure, precipitation (1 for available, 0 for not available)

110110000 stands for accumulation periods of precipitation in the following order: 6h, 12h, 24h, 1h/30min, 3h, 10min, 5min, 6min, 15min. This means the station Wien/Hohe Warte reports precipitation depending on the parameter tRR for the periods: 6h, 12h, 1h, 3h.

The "times"-files give information about the number of reports, the first and the last data and the measurement interval.

e.g. for the Austrian station Wien/Hohe warte

```
9163 11035 Wien_Hohe_Warte 48.24861 16.35639 200 195 ZAMG AT 01010100 12312300 8745 60 1 1 1 1 1 1 1 1 1 1 1
01010100 date of first data in the format MMDDhhmm (all data are for the year 2007)
12312300 date of last data
8745 number of reports
60 shortest measurement interval in minutes
1 1 1 1 1 1 1 1 1 1 1 1 data availability on a monthly basis from January to December (if we have received at least one
report for the respective month then it is set to 1)
```

The sequence of the information of one station report is as follows (28 columns):

Column number	Parameter
1	wMO station number or internal station identifier
2	latitude
3	longitude
4	pressure_sensor_height (m)
5	station_height (m)
6-28	see table 2 running from top to bottom