

## Archive Data weather forecast - Use instructions

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## 0 Overview

### 0.1 Approach

meteoblue forecast are based on a proprietary numerical meso-scale model (NMM) developed in cooperation with NOAA/NCEP and the University of Basel since 2003. Numerical models cover the entire world and enable the production of weather forecast for any place on Earth, irrespective of whether a meteorological recording station exists or not.

Through the high spatial resolution, which calculates forecast for every 10-18 km, meteoblue produces local forecasts which include the effects of local climate, topography and soil cover. Examples of the capabilities of numerical high resolution forecast are:

1. Distinction between valley, slope and summit temperatures in mountain areas.
2. Detection of weather barriers (e.g. Alps, Andes), with distinction of rain, wind, etc.
3. Display of local thermal phenomena, such as winds (e.g. Föhn, Tramontana, Chinook), thunderstorm activity, etc.,

meteoblue detail weather forecasts are calculated for 1-5 days ahead. Larger forecast periods are covered in less detail as special services.

## 0.2 NMM Grid

meteoblue NMM models are composed of evenly spaced grid cells, which cover large domains. A typical meteoblue domain contains between 20'000 and 200'000 grid cells. The atmosphere is divided into 45- 53 layers, for each of which a forecast is calculated.

meteoblue calculates forecasts for each grid cell and layer at least once daily, starting from "initialization" time to the end of the "forecast period", which is 3-5 days. The section Time conventions lists conventions for the forecast timing.

The domains are available for Europe, Africa, and South America.

## 0.3 Archive

meteoblue archives each NMM forecast data set at least once daily. For capacity reasons, only a limited parameter set and only the first 36 hours of each forecast period are saved. Special arrangements are possible.

## 0.4 Parameters

There are 9 standard parameters supplied for the surface level. Atmosphere data are not archived. Other data can be generated.

## 0.5 Use

A License is granted with each data set. Private, research, disaster relief and welfare use are free.

## 0.6 Transmission

Transmission is made in zipped files sent by email or FTP transfer for larger dataset.

# 1 Product

## 1.1 Time conventions

meteoblue NMM grid data is calculated and stored in UTC. Timestamps are given in hours, for a range of twenty-four hours (24-h) from 00:00-23:00.

**Forecast Initialization** is the time at which the model calculation has started.

**Forecast period** is the time covered by the forecast, and is defined in 3 possible ways as:

1. Days from forecast initiation: initiation is usually UTC 00 and 12. Days are given in 0 (date of initiation) + number of days. Standard format.
2. Hours from forecast initialization: initiation is usually UTC 00 and 12. Hours are typically 24, 72, and 120. Definition: UTC+hours.
3. Days from forecast use: Days are given in 0 (date of transmission) + number of days. This method is best used, if transmission is set to occur before the day of use.

For archive data, hours from initialization is used (type 2).

## 1.2 Scope

meteoblue offers the NMM archives for several continents. An overview of data available is in Table 1. For areas with overlapping domains (e.g. Europe), the required domain has to be defined for processing the request.

## 1.3 Parameters

The parameters archived are listed in Table 2. All parameters are generated routinely as part of the daily model updates calculated by meteoblue.

**Table 1.** Scope of product offer for Archive Data Weather forecast services– status June 2008.

#	Domain	Details	Resolution	Coverage	Start	End	Comment
1.	EU	NMM-13	0.1° (~13 km)	36-60N, 10W-72E: <b>EU, Caucasus, North Africa.</b>	Feb 2007	current	Gap in Feb'08
2.	Central Europe	NMM-3	0.03° (~3km)	41-53N, 3W-20E: GB NE <b>BE FR DE CH AT CZ PL SL HU SI HR IT ES.</b>	Feb 2007	current	Continuous
3.	Africa	NMM-18	0.15° (~18 km)	6N-36S, 5-46E: <b>South of Equator.</b>	Mar 2007	current	Continuous
4.	LATAM	NMM-18	0.15° (~18 km)	12N-50S, 24-85W: <b>all continent</b>	Mar 2007	current	Gap in Aug'07
5.	SEA	NMM-18	0.15° (~18 km)	23.5N-10S, 91-150E: <b>all South East Asia</b>	Jan 2008	current	

**Table 2.** Base parameters for Archive Data Weather forecast– status June 2008.

#	Parameter <sup>1)</sup>	Unit <sup>1)</sup>	Abbr <sup>3)</sup>	Code <sup>3)</sup>	Format <sup>4)</sup>	Comment <sup>5)</sup>
1.	Air Temperature (2 m a.g.)	°C	Tmp	<b>_011</b>		
2.	Dewpoint (2 m a.g.)	°C	Td	<b>_017</b>		
3.	Precipitation amount total	mm	Rg	<b>_061</b>		
4.	Precipitation amount convective	mm	RgC	<b>_063</b>		
5.	Snow fraction	mm	SNOWEQV	<b>_143</b>		
6.	Wind speed (U component)	m/s	UWind	<b>_033</b>		
7.	Wind speed (V component)	m/s	VWind	<b>_034</b>		
8.	Radiation	W/m <sup>2</sup>	SWRDOWN	<b>_204</b>		
9.	Mean sea level pressure	hPa	Ld	<b>_002</b>		

Legend: <sup>1)</sup> archive data; <sup>2)</sup> Convention; <sup>3)</sup> internal code; <sup>4)</sup> I6.3 is a number with 6 digits (including prefix + or -) and 3 decimals. <sup>5)</sup> Standard in **BOLD**.

**Table 3.** Archive Data Time series– status June 2008.

#	Series <sup>1)</sup>	Forecast period <sup>2)</sup>	Interval <sup>2)</sup>	Time <sup>3)</sup>	Comment <sup>5)</sup>
1.	<b>Continuous</b>	<b>12-35 hours<sup>4)</sup></b>	<b>Hourly</b>	<b>Continuous series</b>	<b>One series from start to end</b>
2.	Early continuous	0-23 hours	Hourly	Continuous series	One series from start to end
3.	Late continuous	24-47 hours	Hourly	Continuous series	One series from start to end
4.	Overlapping	0-144 hours	Hourly	Parallel series	Each day has 2-6 forecasts
5.	Custom <sup>4)</sup>	0-72 hours	Other	Per request	Per request
6.	Aggregate <sup>6)</sup>	12-35 hours	6-hours	Continuous series	One series from start to end
7.	Aggregate <sup>6)</sup>	12-35 hours	24-hours	Continuous series	One series from start to end

Legend: <sup>1)</sup> own terms; <sup>2)</sup> definition in section 1.1; <sup>3)</sup> in dataset provided; <sup>4)</sup> best forecast accuracy, according to statistic validation; <sup>5)</sup> Standard in **BOLD**; non-standard require previous agreement; <sup>6)</sup> special request.

## 1.4 Forecast period

Standard format for forecast data archive (see Table 3) includes forecast hours 12-35 after initialization (see section 1.1 Time conventions). Other formats require separate agreement.

The model forecasts are statistically most accurate between forecast hours 12 and 36. Other timings are only provided on request, to develop models or special applications.

## 1.5 Archive period

Archives have been started in February 2007 (see Table 1). The archive periods are listed in the columns Start and End.

## 2 Data format

### 2.1 Metadata

The metadata give position and elevation of the forecast point and type of surface (see Table 4). These are supplied in a separate data set.

### 2.2 Parameters

The parameters list (see Table 2) and formats are available from the data archives. On request, additional parameters can be archived over a defined time period. For some parameters, missing values may be given as "255" (these are originally 999 values compressed into 255 due to the binary data format).

### 2.3 Standard File format

The parameters are provided in .csv format files, with one file per parameter. File names contain the parameter code and name (code\_017\_2mabovegnd.txt). The data are vertically sorted by date, with different locations in horizontal columns.

**Table 4.** Archive Metadata: Parameters and units – status June 2009.

#	Parameter	Unit <sup>1)</sup>	Format <sup>2)</sup>	Sample <sup>3)</sup>	Comment <sup>5)</sup>
1.	grid-cell ID	LongLat	<b>Text</b>	00585E5000N	Model standard
2.	Longitude model	dec. deg.	<b>I7.3</b>	5.855	W as negative (-)
3.	Longitude model	dec. deg.	<b>I6.3</b>	50.001	South as negative (-)
4.	Elevation model	m a.s.l.	<b>I4.0</b>	454	For area around location
5.	Land-Seamask	(0=land,1=water)	<b>I1.0</b>	1	(0=land,1=water)

Legend: <sup>1)</sup> definition used; <sup>2)</sup> I = integer number; I6.3 is a number with 6 digits (including prefix + or -) and 3 decimals. <sup>3)</sup> from dataset; <sup>4)</sup>; <sup>5)</sup> Standard in **BOLD**.

**Table 5.** Sample of an archive data set for temperature 2m above ground on 2 locations, from 01.05.2007 to 02.05.2009.

datum	41.4000/19.9500	41.0000/20.9100
01.05.2007 12:00	12.510 13.470	
01.05.2007 13:00	11.880 13.050	
01.05.2007 14:00	11.340 12.260	
01.05.2007 15:00	10.950 11.460	
01.05.2007 16:00	10.600 10.830	
01.05.2007 17:00	10.280 10.420	
.....		
02.05.2009 09:00	16.040 12.450	
02.05.2009 10:00	15.920 13.750	
02.05.2009 11:00	16.250 13.140	

### 2.4 Data format

A sample of an archive data set for temperature is shown in Table 5.

## 3 Use

### 3.1 License

The user receives a license for use of data for the purposes agreed. Meteoblue does not grant a license for resale of the data unless permission has been granted by meteoblue expressly in written.

### 3.2 User Rights

General Terms are available on [www.meteoblue.com](http://www.meteoblue.com) under "Terms" (status June 2008).

Data can always be used for private, research, disaster relief and welfare purposes. If data or results obtained with the data are partially or fully published under any of these uses, the publication should contain a reference to meteoblue. Reference can be limited to the term "forecast data by [www.meteoblue.com](http://www.meteoblue.com)", or follow official citation rules.

### 3.3 Commercial Use

Commercial use with the purpose of generating revenue with or through the use of the data requires a separate agreement with meteoblue AG (see [www.meteoblue.com](http://www.meteoblue.com), Terms).

## 4 Data transfer

### 4.1 Mail

For smaller request of less than 2 MB, the files are transferred by email, as .zip file attachments sent to a defined email address.

### 4.2 FTP

For larger or repeated request of more than 2 MB, the files are transferred to a meteoblue FTP account, from which they can be downloaded by customer.

**Table 6.** Archive Metadata: Parameters and units – status June 2008.

#	Transfer <sup>1)</sup>	Requirements <sup>2)</sup>	Format <sup>3)</sup>	Sample <sup>4)</sup>	Comment <sup>5)</sup>
1.	<b>e-Mail</b>	<ul style="list-style-type: none"> <li>&lt; 2MB</li> <li>Email address known</li> </ul>	<b>Zip file</b>	Archive.zip	Simple, low cost version
2.	<b>FTP transfer</b>	<ul style="list-style-type: none"> <li>Large file sets</li> <li>FTP access</li> <li>Contract</li> </ul>	<b>.csv file</b>	code_143_sfc.txt	Large data sets. Contract required.

Legend: <sup>1)</sup> definition used; <sup>2)</sup> minimum required for transfer method; <sup>3)</sup> for files; <sup>4)</sup> filename; <sup>5)</sup> Standard in **BOLD**.

## 5 Forecast Data definitions

### 5.1 Forecast Parameters

meteoblue produces a minimum of 40 parameters with each forecast model. A list of parameters and their units and formats is provided in Table 8. For special request, additional parameters can be archived.

### 5.2 Live forecasts

meteoblue can also supply live forecast data. Terms are available through [www.meteoblue.com](http://www.meteoblue.com) – see page "Our Products".

## 6 Ordering process

### 6.1 Pricing

meteoblue offers archive data on request for standard prices, valid for advance payment (see Table 7). Separate prices for larger volumes are available on request.

**Table 7.** Standard Data prices.

#	Price element	Unit <sup>1)</sup>	Reference <sup>2)</sup>	Value <sup>3)</sup>	Comment <sup>5)</sup>
1.	Base domain price	Domain	Table 1	200 Euro	Model standard
2.	Base parameter price	Parameter	Table 2	100 Euro	W as negative (-)
3.	Variable location price	Location	Table 4	2 Euro	per location
4.	Variable price per year	Year	365 days	1 Euro	per parameters
5.	Volume rebate of 1%	1% of total	per each increase of	+1'000 Euro	Capped at -50%

Legend: <sup>1)</sup> definition used; <sup>2)</sup> l = integer number; l6.3 is a number with 6 digits (including prefix + or -) and 3 decimals. <sup>3)</sup> from dataset; <sup>4)</sup>; <sup>5)</sup> Standard in **BOLD**.

### 6.2 Ordering process

The ordering process is displayed in Table 8.

**Table 8.** Data order overview.

#	Step <sup>1)</sup>	Responsible <sup>2)</sup>	Contact point <sup>3)</sup>	Form <sup>4)</sup>	Comment <sup>5)</sup>
1.	Download archive specifications	Customer	meteoblue.com/Products/data/archive	_ARCHIVE_specification .pdf	see www.meteoblue.com
2.	Request	Customer	sales@meteoblue.com	email	Domains, parameters, locations, time range
3.	Provide offer	meteoblue	customer email	Invoice	Conditional invoice
4.	Place order	Customer	sales@meteoblue.com	email	Confirm order
5.	Payment	Customer	<a href="#">meteoblue</a> bank account	bank transfer	Payment terms
6.	Data transmission	meteoblue	customer email/FTP	File	time: 1-4 weeks.

Legend: <sup>1)</sup> Process step; <sup>2)</sup> Rôle. <sup>3)</sup> for information. <sup>4)</sup> in which format; <sup>5)</sup> Key information needed.

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