# meteoblue AIR Meteogram



## 1 Display

**meteoblue AIR** meteograms show the weather development in the atmosphere, from ground to around 5'000 meters elevation (pressure levels 1020 to 500 mbar) simulating the air layerings above the selected location. **Parameters** shown are **air temperature** and **wind speed** and direction at ground and various atmosphere levels, including the zero degree (°C) line, **precipitation** and **clouds, air pressure** and **radiation** for the forecast range (1st to 3rd or 6th day after forecast calculation = 3 to 6 days ahead). meteoblue **AIR meteograms** show the weather for the area corresponding to a model gridcell. Specific conditions at the selected location (altitude, inclination) are not displayed. All data are displayed in UTC-time (Greenwich), from beginning to the end of the forecast range.

## 2 Parameters

### 2.1 Temperature

Temperature charts (Figure 1) show the hourly temperature course (in °C) during the forecast range, for air temperature 2 m above ground level and dew point temperature (temperature at which dew would form under the local conditions), as well as relative air humidity (RH, in %).

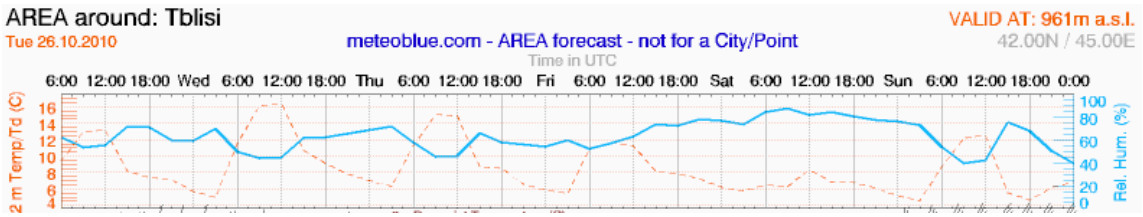


**Figure 1.**Temperature and Relative Humidity. Air temperature at 2 m above ground level in °C (dotted line), dew point temperature in °C (dark red line), RH in % (blue line).

### 2.2 Pressure levels (air layers)

The temperatures levels and wind is shown for different Pressure levels (from 1020 to 500 hPa) in the pressure levels chart (Figure 2). The temperature colour schemes adapt to the temperature range. The "zero degree" or "freezing" line is shown as light blue curve, if it is below 5'000 meters altitude. Wind is shown in 3-hour intervals in form of wind barbs (see section Figure 8). The ground level of the selected location may be lower or higher than the altitude shown by an **AIR meteogram**. The average altitude of the surrounding area is shown by a line in the temperature chart and a bordeau bar at the bottom of the cloud chart.

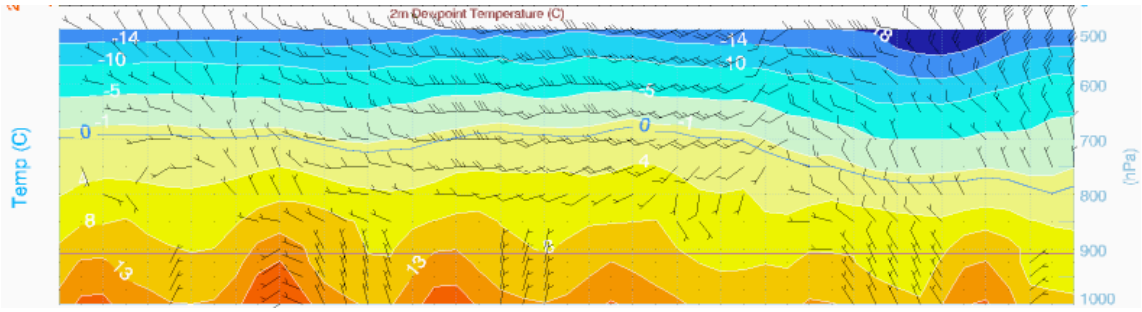


**Figure 2**. Temperature chart with 3 day forecast. Variable scale based on expected temperature. Temperature is also shown by colour. Surrounding area altitude is 900 hPa (800 m asl).

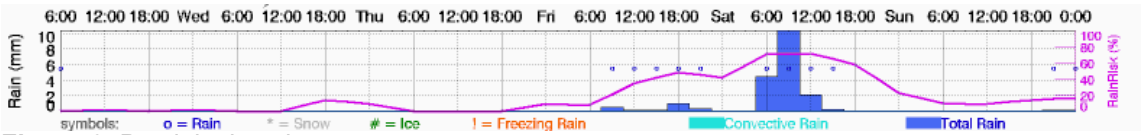


**Figure 3.** Precipitation chart.

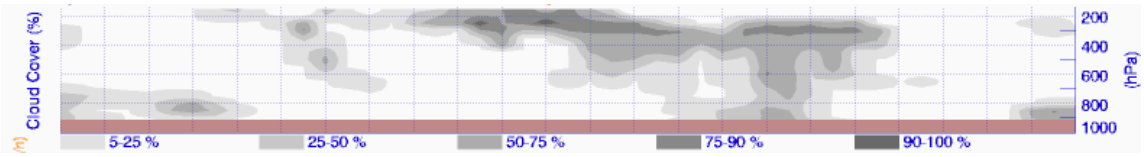


**Figure 4.** Cloud chart with 6 day forecast. Cloud cover in 5 classes (as % of total sky cover). Ground level as average of surrounding area.

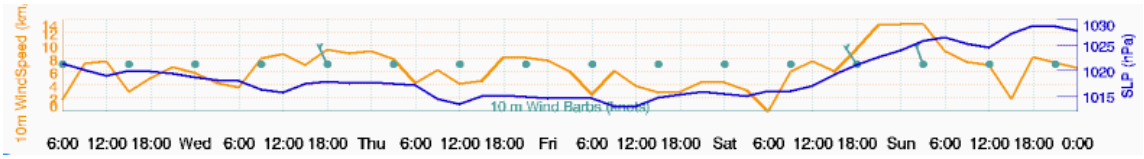


**Figure 5.** Wind chart with 6 day forecast. Wind speed in km/h (kilometer per hour). Wind barbs (symbols) indicate the cardinal directions (N, S, E, W) from which the wind is blowing.

## 2.3 Precipitation

The precipitation charts(Figure 3) shows amount, type and probability of precipitation. **Precipitation amount** is shown in mm (which corresponds to liter per square meter). Total precipitation amount (blue bars) is the sum of shower (light blue bars) and frontal precipitation (not indicated separately). **Precipitation types** are rain (o), convective rain (caused by local ri sing processes), snow (*), ice (#) in form of small pellets), freezing rain (!). Hail is not dis tinguished because of the rare and very local occurence and because of lower forecast accu racy. **Precipitation probability** is calculated from the frequency of precipitation forecasts in pre vious forecasts, in the region, and in neighbouring hours, and shown as percent (%).

## 2.4 Clouds

Cloud charts show the cloud development over the forecast period in 0 -14 kilometer altitude above sea level (km asl). The **average altitude** of the surrounding area is plotted at the chart bottom. In the sample (Figure 4), the average altitude is 800 m. A cloud base (lower end of the clouds) below the altitude of the selected location indicates mist or fog in the low areas. **Cloud cover** is shown in grey scale steps (see chart legend) and given in percent (%), indicating the percent of the given air layer which is occupied by a cloud (condensated water). Typically, high clouds will form thin layers, which allow sunlight to pass even with 100% cover, whereas clouds below 8 km altitude will not let direct sunlight pass once they cover more than 90% of the sky. See the radiation (Figure 6) for results.

From the height, density and sequence of the clouds, the expected type of weather can be inter - preted. A typical cold front starts with low clouds, which build up over time. Thunderstorm wea -

ther is characterized by cloudless mornings and rapid cloud development during the day, with dense and high clouds in the afternoon, which may disappear again during the night. By using the cloud graph for some time, you will be able to understand the expected weather patterns .

### 2.5 Wind

Wind charts (see Figure 5) show the hourly wind speed and direction during the forecast period. **Wind speed** is shown in a curve (km/h) for maximum wind speed (wind gusts) during the previous indicated hour. **Wind direction** is shown by wind barbs indicating the speed and cardinal directions (N, S, E, W) from which the wind is blowing (see Figure 8).

Wind speed is provided in kilometers per hour (km/h). The wind symbol descriptions are given in knots. Conversions between common units of speed are given in Table 1 (Section 3).

### 2.6 Radiation

Radiation is expressed as W/m² for the respective hour ( Figure 6). SW means "Short Wave", LW means "Long wave" Radiation. "Down" is radiation from sky to ground. Radiation "up" is the radiation from the ground to air.

**Latent heat** is the amount of energy in the form of heat released or absorbed by a chemical substance during a change of state (i.e. solid, liquid, or gas), or a phase transition.

In the atmosphere, when a molecule of water evaporates from the surface of any body of water, energy is transported by the water molecule into a lower temperature air parcel that contains more water vapor than its surroundings. Because energy is needed to overcome the molecular forces of attraction between water particles, the process of transition from a parcel of water to a parcel of vapor requires the input of energy causing a drop in temperature in its surroundings. If the water vapor condenses back to a liquid or solid phase onto a surface, the latent energy absorbed during evaporation is released as sensible heat onto the surface. More information is under http://en.wikipedia.org/wiki/Latent_heat.

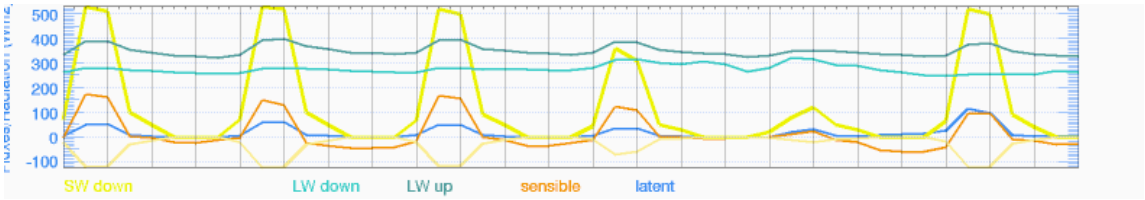


**Figure 6.** Radiation (W/m²) chart for 3 days, for the respective hour. SW means Short Wave, LW means Long Wave radiation; "down" = incoming (from sky); "Up" = reflected (from ground).

# 3 Units & conversions

### 3.1 Wind speed and direction

An overview of wind symbols is shown in Figure 7. The wind speed conversions between common units of speed are given in Table 1.

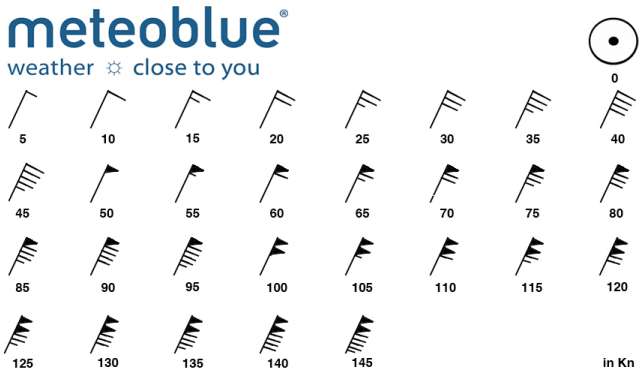


**Figure 7.** Wind barbs (symbols) indicating the speed (in knots) and cardinal directions (N, S, E, W) from which the wind is blowing.

Table 1. Conversions between common units of speed (Values in **bold face** are exact.)

| | m/s | km/h | mph | knot | ft/s |
|---|---|---|---|---|---|
| **1 m/s =** | **1** | **3.6** | 2.236936 | 1.943844 | 3.280840 |
| **1 km/h =** | 0.277778 | **1** | 0.621371 | 0.539957 | 0.911344 |
| **1 mph =** | **0.44704** | **1.609344** | **1** | 0.868976 | 1.466667 |
| **1 knot =** | 0.514444 | **1.852** | 1.150779 | **1** | 1.687810 |
| **1 ft/s =** | **0.3048** | **1.09728** | 0.681818 | 0.592484 | **1** |

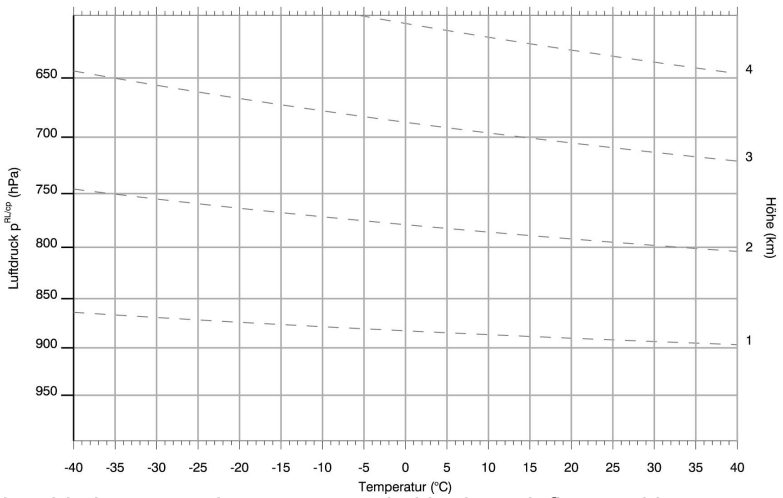


**Figure 8.** Relationship between air pressure and altitude as influenced by temperature.

### 3.2 Pressure levels & altitude

Pressure is provided in hPa (hectoPascal). The pressure levels are standard atmosphere layers. Altitude is given in kilometers above sea level (km asl). The actual altitudes can be calculated from the chart for transformation of air pressure into altitude (Figure 8).

The elevation of the AIR meteogram is the averaged elevation of the model "grid cell" (smal lest unit of area) from which the meteogram is extracted: this may be dif ferent from the elevation of the selected location. The "grid cell" size determines the area for which the meteogram is valid: the diameter is equivalent to one third of the corresponding rainSP☼T radius (see Pict☼cast) and may vary between forecast domains: Check a location's pict☼cast for the rainSP☼T radius.

### 3.3 Time

All time stamps used are UTC (Universal Coordinated Time), corresponding to time at the 0° Meridian. Time for places with Eastern longitude has to be added (+ 1 to +12 hours) and time for places with Western longitude subtracted (- 1 to -12 hours). Local time zone information is available in the Standard meteogram or Pictocast (which contain sunrise and sunset time), from local airports or http://www.timeanddate.com//worldclock/. In AIR meteo grams produced for Sydney (Australia) and San Francisco (US), noontime will be dis played at 2 and 20 UTC, respectively. Summer time switches are not considered in the display. The day- and night times are not shown, to allow good display of the other parameters.

## 4 Recommendations for use

The AIR meteogram can be used for all planning involving atmosphere observation, such as Flight planning; Balloon journeys; Radiation analysis; Weather measurements; Mountaineering; Air inversion monitoring; Local weather forecasting; amongst others. AIR meteograms are the best source to get an understanding of the expected local weather patterns.

The AIR meteogram does not display day and night time. You can find local sunrise and sunset times for the same location in the meteoblue pictocast diagrams. meteoblue mete ☼maps will complement the local information of the meteogramAIR by giving regional overviews. For longer term planning, use the meteogram 6-14 day. More information on forecasts and display can be found on www.meteoblue.com (see HELP AIR meteograms).