meteoblue AGRO Meteogram

1 Content

meteoblue AGR☼ meteograms show the development of the weather with the following parameters: **air temperature**, **wind speed** and **direction**, **precipitation**, **clouds** and **Spray window** as well as **moisture** for one to six days ahead. The data apply to the forecast area which is equivalent to a model grid cell (see 4.1.), without any special adaptation to conditions (e.g. inclination, land cover) of the selected location. All parameters are displayed in local time.

2 Display

2.1 Temperature

Temperature diagrams (Fig. 1) show hourly air temperature (°C) in 2 meters above ground, as well as day and night time (yellow vertical bars).

2.2 Precipitation

The precipitation diagram (Fig. 2) shows amount, type and probability of precipitation. Blue bars show the amount in millimetres (mm =litre per square metre per hour) as amount of convective (light blue) and total (blue) precipitation. Symbols show the precipitation types: rain, snow (*), ice (#) or freezing rain (!). Hail isn't displayed because it appears rarely and is usually very local. The probability of rain (%) is calculated from the regional and temporal distribution.

2.3 Clouds

The cloud diagram (Fig. 3) shows the development of clouds within 0 – 14 km asl altitude. The density of clouds is shown in grey scale: the darker the denser. A brown bar at the bottom of the diagram shows the average altitude of the area (not shown in Figure 4), if the altitude above 500 m asl. In situations where clouds in the diagrams touch the brown bar, there is a chance of fog.

The cloud cover shows how much water is condensed in various air layers and forms a cloud. Higher clouds can still allow passage of direct sunlight with 100% cover. Lower clouds (normally below 8 km asl) will not allow passage of direct sunlight with more than 95% cover. From the altitude, density and number of clouds, the weather development can be read. A typical cold

front begins with low clouds, which grow higher over time. Thunderstorms are characterised by clear mornings and rapid development and rise of clouds. Thereby, cloud dia grams help you to recognise the weather development much easier.

2.4 Spray window

The Spray window (Fig. 4) helps identifying suitable periods for applying crop pro tection measures, by showing suitable (green), less suitable (yellow) and unsuitable (red) periods for appli cation. The conditions are calculated from wind, precipitation, temperature and humidity (see 3.4.).

2.5 Moisture

The evaporation (mm) and relative humidity (%) are shown in Figure 5. The actual evaporation results from the air steam pressure and the prevalent land cover (water, sand, rock, fields, forest...) of the area. The diagram shows the balance of evaporation and transpiration (Evapo - transpiration) and the relative humidity in the area. Positive evapotranspiration results in a re lease of water into the atmosphere. If the evapotranspiration is zero, no water evaporates from the soil into the atmosphere. The water reserve in the soil increases, if the amount of precipitation surpasses the evapotranspiration (more information in the description of meteograms).

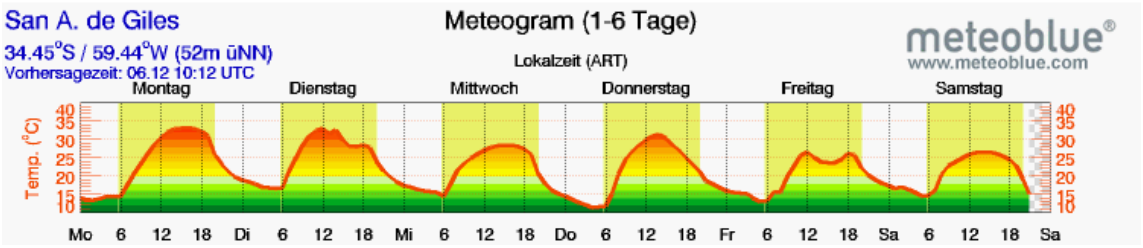

Figure 1: Temperature diagram.

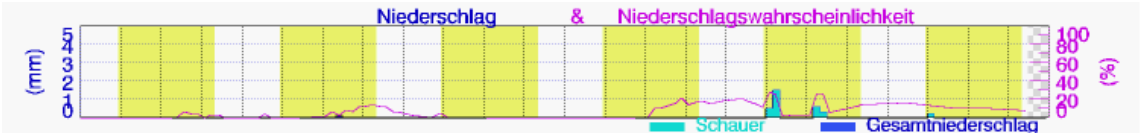

Figure 2: Precipitation diagram with amount and type.

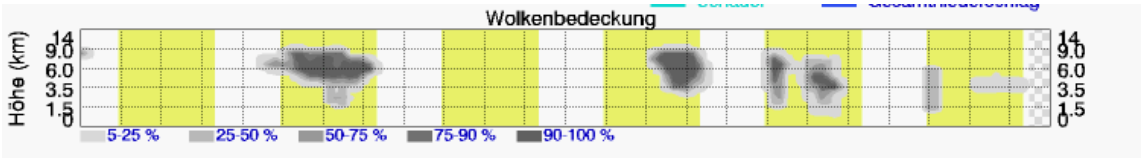

Figure 3: Cloud diagram, with 5 cloud cover classes (in %). Brown bar at bottom: Area altitude .

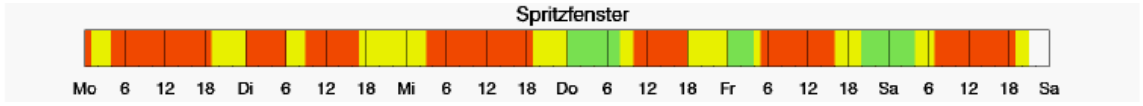

Figure 4: Spray window, with suitable (green), less suitable (yellow) and unsuitable (red) periods for application (in hourly intervals).

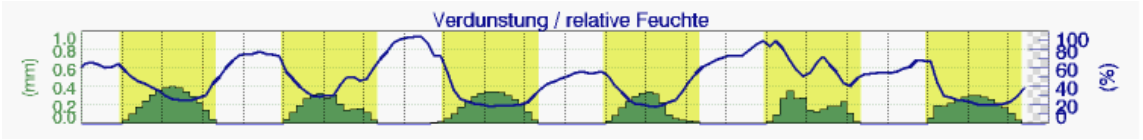

Figure 5: Moisture diagram with hourly evaporation and relative humidity.

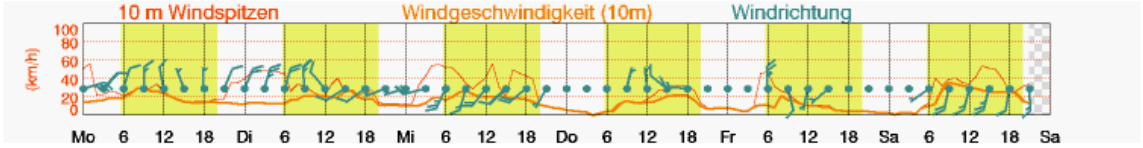

Figure 6: Wind diagram with 6 day forecast. Wind speed and gusts in km/h (kilometre per hour). Wind barbs (symbols) show the direction of the wind (N, S, E, W).

2.6 Wind

The wind diagram (Fig. 6) shows the wind speed in (km/h) and direction in 10 metre above ground in hourly intervals. The average wind speed of the preceding hour is displayed by the thick orange line, whilst the line above shows the maximum speed (gusts) for that hour. The wind barbs display the direction from which the wind blows (Figure 8).

3 Parameters

3.1 Temperature

The air temperature (Fig. 1) is shown in °C as calculated for a measurement taken at 2 metres above ground in a sheltered measuring station. Temperatures on the ground, in the sun or between plants can differ be several °C, as well as the dew point or rel. humidity (%) can.

3.2 Precipitation

Precipitation is calculated for the area of a grid cell. The spatial distribution can differ sub stantially within the area. To evaluate the precipitation amounts, the spatial and temporal distribution should be considered and compared to local measurements.

3.3 Clouds

Cloud diagram (Figure 3) are calculated for the area of a grid cell. The clouds in adjacent cells are not included. Adjacent clouds could play an important role, if factors like hills, coastlines or solar inclination have important influence on the selected location.

3.4 Evaporation

Evaporation mainly depends on the following factors: air temperature, humidity, insolation, speed and direction of wind, nature of the ground, vegetation and the water reserve in the ground, as well as on the amount of precipitation.

Because of the diverse influencing parameters, the evaporation is difficult to determine, so cal - culation approaches are often used. The resulting evaporation per time unit, the "speed of evaporation" is also called the evaporation rate.

For the calculation, the land use in the area is considered. The actual land use can be modified by agricultural or other uses. The land use model is further described under: http://www.rap.ucar.edu/staff/feichen/LSM/LSM-tutorial.pdf .

3.5 Wind

The wind is calculated for the area of the grid cell (see 4.1.). Therefore, all the wind speeds of the area are aggregated. Local wind conditions can differ substantially. Generally, there are esta - blished relationships between large scale weather conditions and local wind patterns, which can be estimated through comparison of forecasts to local measurements.

4 Units and references

4.1 Forecast area

The AGRO meteogram displays the forecast for one model grid cell. This grid cell has a radius of several kilometres and is the smallest forecast calculation unit. The radius of a grid cell is a third of the radius indicated in the rainSP☼T for the selected location (see Pictocast).

The forecast for all parameters (except temperature) is valid for the average altitude of the area in the grid cell. This altitude can differ from the altitude of the selected location. Weather forecasts for the a special location within the area can be looked up in the p☼int forecasts (pict☼cast, mete☼gram).

4.2 Time

Every time stemp are in local time. To find out your personal time zone, please contact an airport near you or visit http://www.timeanddate.com//worldclock/.

4.3 Wind speed and direction

The description of the wind symbols are shown in Figure 6. Conversion into different units can be found in Table 1.

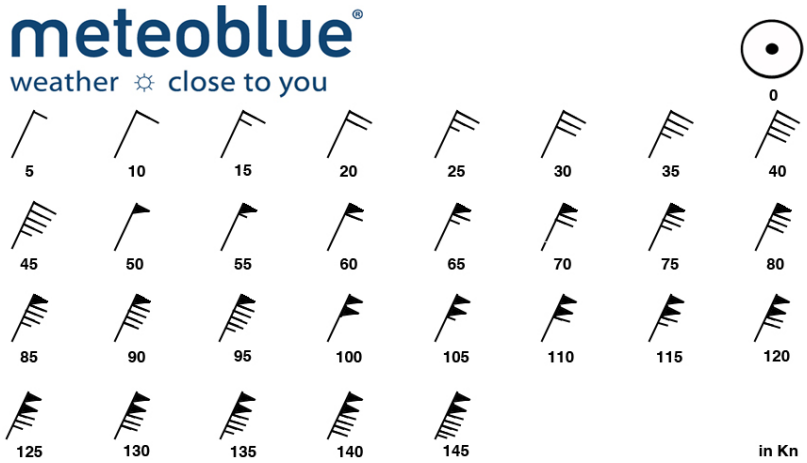

Figure 7. Wind barbs (symbols) show wind speed and direction from which wind blows (N S E W).

Table 1. Conversion table for wind speed units (**bold numbers are exact**)

	M/Sec	km/h	M p S	Knots	Feet/Sec
1 M/Sec =	**1**	**3.6**	2.236936	1.943844	3.280840
1 Km/h =	0.277778	**1**	0.621371	0.539957	0.911344
1 Mile pro Std. =	**0.44704**	**1.609344**	**1**	0.868976	1.466667
1 knots =	0.514444	**1.852**	1.150779	**1**	1.687810
1 Feet/Sec =	**0.3048**	**1.09728**	0.681818	0.592484	**1**

Table 2. Spray window warnings – Parameters and threshold.

Parameter	Unit	Low risk	Medium risk	High risk
Minimum temperature	(°C)	> 5°C	< 5°C	< 0°C
Maximum temperature	(°C)	<30°C	>30°C	>35°C
Relative humidity (min)	(%)	>60%	>30%<60%	<30%
Relative humidity (max)	(%)	<95%	>95%<99%	>99%
Amount of precipitation (water)	mm	<0.1 mm/h	0.1-0.3 mm/h	>0.3 mm/h

4.4 Spray window

Usage: The Spray window shows conditions for crop pro tection measures based on weather forecast at the chosen location. The advice should be controlled before making the application.

Criteria: For the Spray window, constant criteria are used which select the best periods for ap - plication. A warning is displayed when a value of one parameter exceeds the threshold (Table 2).

Parameter thresholds: The exceeding of thresholds for each parameter leads to decreased ef - fectiveness, by either evaporation, wash-off or lesser uptake of the active ingredients .

5 Use recommendations

The AGRO meteogram can be used in agriculture, silviculture and gardening, for planning measures which are affected by the conditions of atmosphere. It shows a forecast for the area, which can be adapted to local conditions and land management through experience. For important decisions, frequent comparisons with local observations should be carried out.

Sunrise and sunset and other parameters can be seen on p☼int meteograms and pict☼cast on www.meteoblue.com. meteoblue mete☼maps complement the AGR☼ meteogram with regional overviews. To get forecasts with larger range, use the “Mete☼gram 6-14d”. More information about forecasts and displays can be found on www.meteoblue.com under HELP.