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BECAUSE WEATHER MATTERS



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**Weather Information
and Alert Systems for
Railroads**

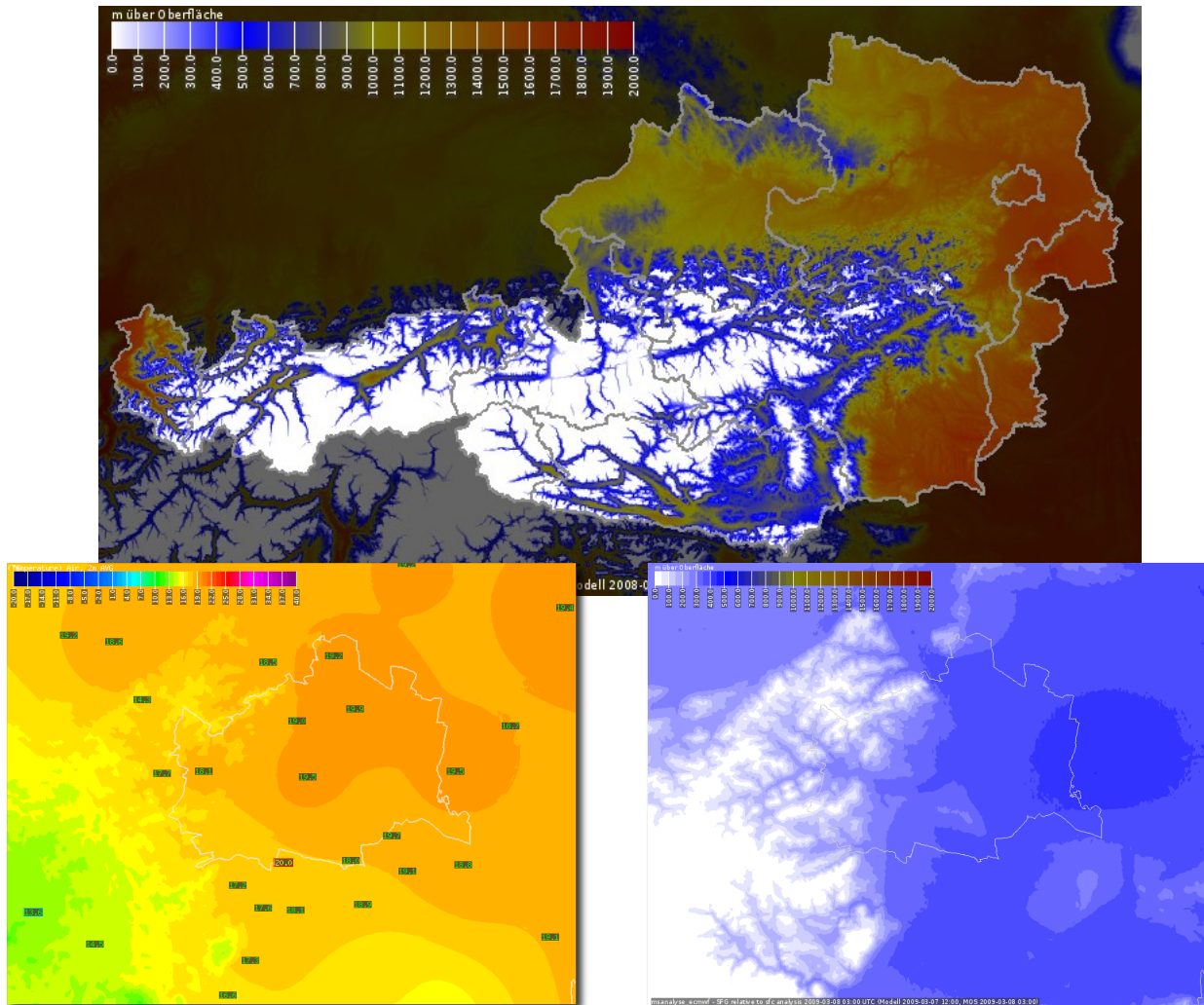
UBIMET – because weather matters



- ▶ One of the largest private weather services in Europe
- ▶ Provides severe weather warnings for more than 1 million clients via SMS/Email
- ▶ Present in Austria, Germany, Switzerland, Hungary, Poland, Czech Republic, Slovakia, Croatia, Romania, Serbia and Montenegro
- ▶ Innovation leader and market leader in severe weather warnings
- ▶ Services for insurance sector, infrastructure operators, energy providers, etc.
- ▶ One of the most dense weather station networks in Europe

UBIMET local model for infrastructure

- ▶ Special models for networks
- ▶ Developed in own laboratories
- ▶ High topographic resolution
- ▶ Used by big infrastructure operators (DB, Wiengas, ÖBB, STRABAG,...)
- ▶ E.g. Important in estimating the freezing level

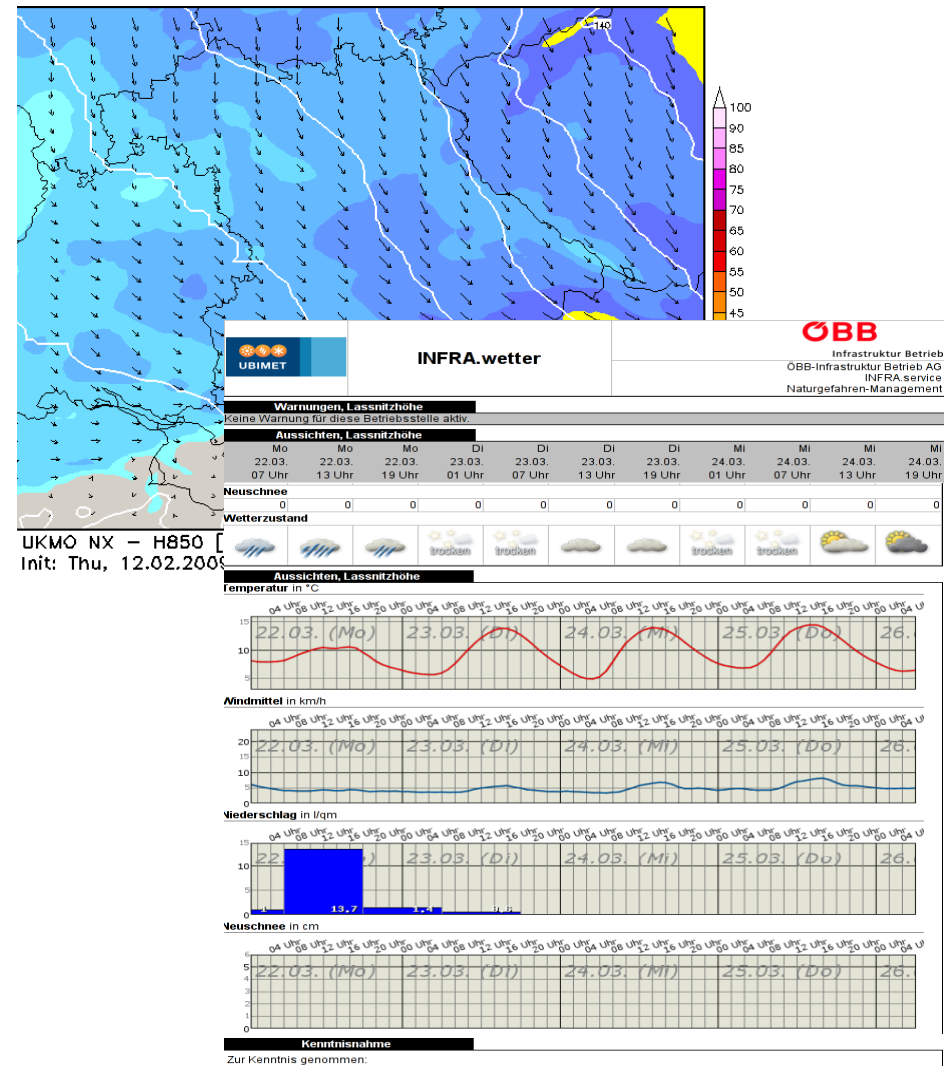


FOTOS:

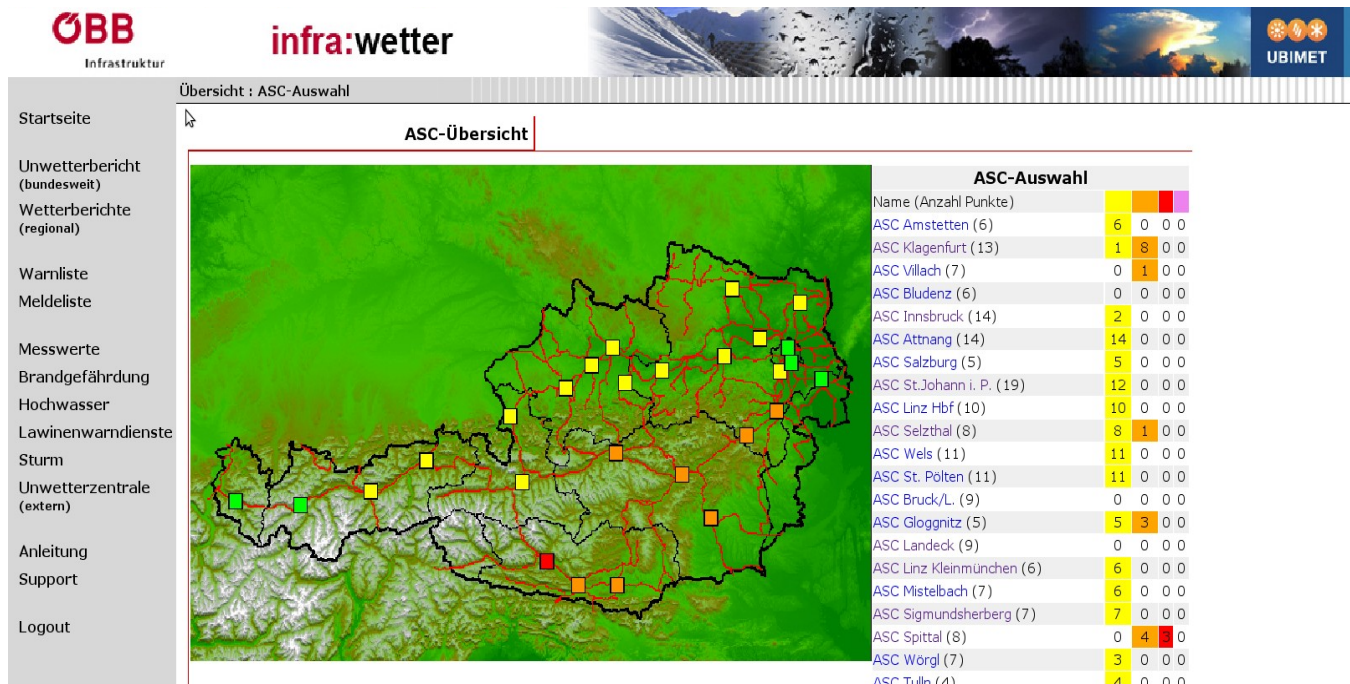
Up: E.g. Freezing level Austria
 Left: Temperature regional forecast
 Right: Snow precipitation regional forecast

Weather Forecast Systems for rails

- ▶ Detailed weather forecasts for the complete rail network
 - ▶ risk of high wind speeds
 - ▶ risk of very heavy rain & flooding
- ▶ Temperatures
- ▶ Important information for assessment of possible disruptions and for speed instructions
- ▶ Tailored to the needs of the railway operators
- ▶ All important meteorological data are integrated in one single online portal

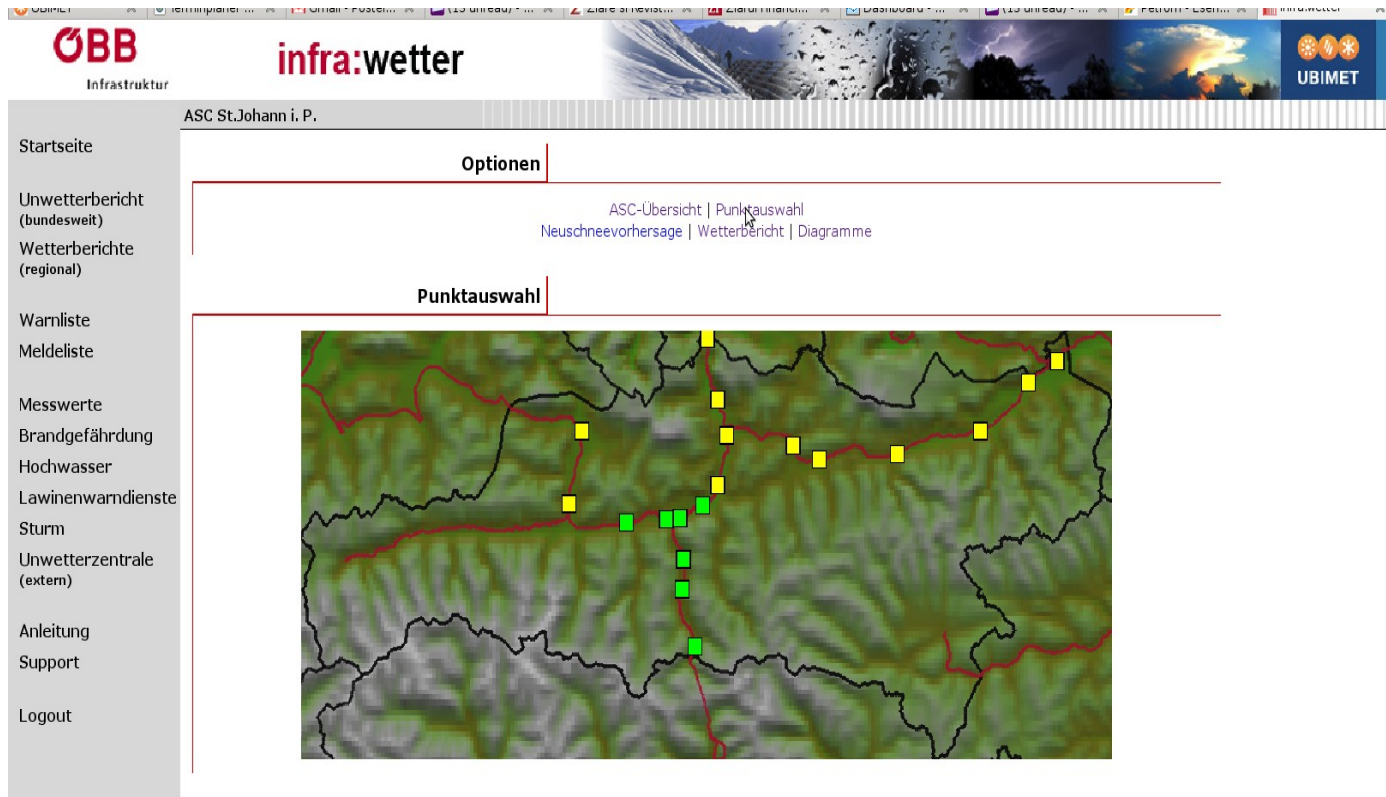


E.g.: Main points



- Defined by the customer
- Colour depends on the phenomenon's intensity, even if this takes place in a subpoint of the main point. From a certain level they blink.
- Through a click on the point you reveal the subpoints and their details.

E.g. Subpoints



- For each subpoint you reveal forecasts and bulletins with the desired weather parameters.
- They colour themselves according to the intensity
- Defined by the customer



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Diagrams

Warnliste
Meldeliste

Messwerte
Brandgefährdung
Hochwasser
Lawinenwarndienste
Sturm
Unwetterzentrale
(extern)

Anleitung
Support

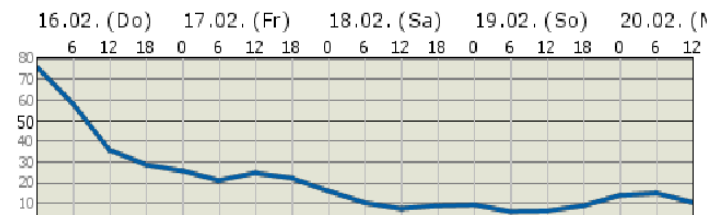
Logout

Diagramme

Windrichtung (2500m)



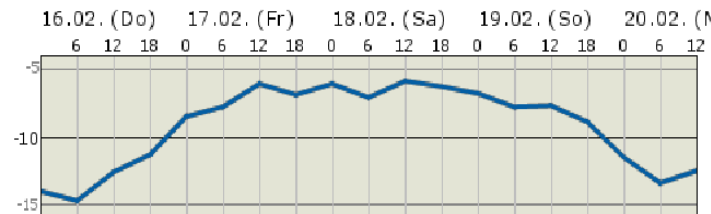
Windstärke (2500m)



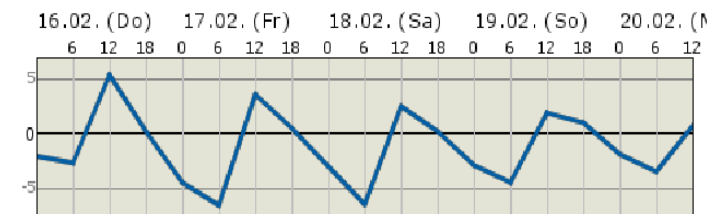
Wetterzustand



Temperatur (2500m)



Temperatur (800m)

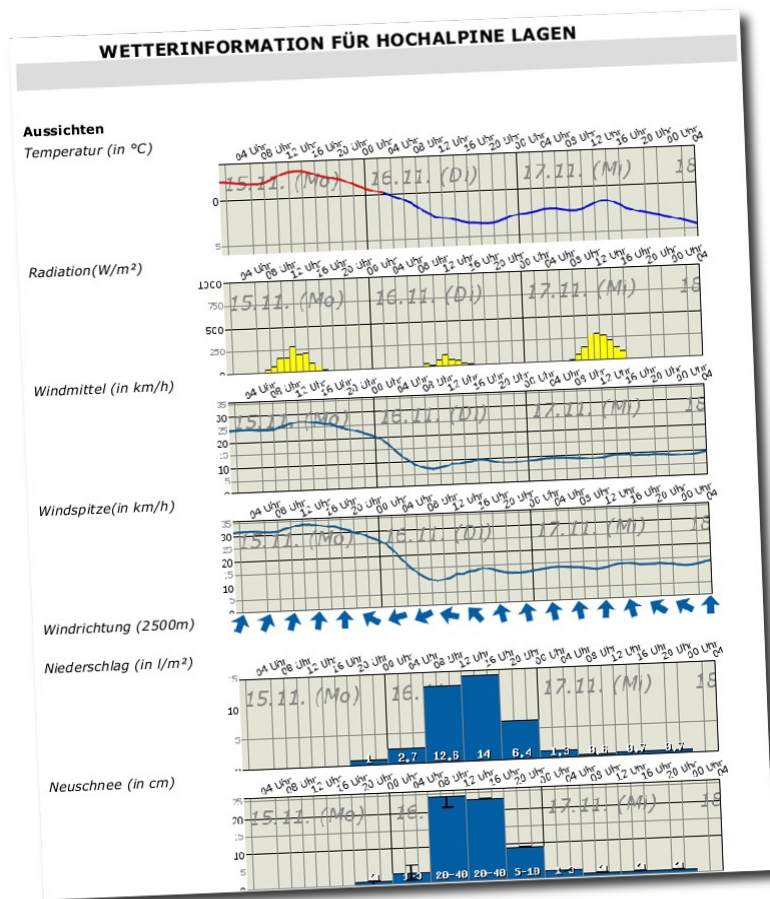


► For each subpoint it displays diagrams with the desired parameters' forecasts, for the desired time intervals and warnings forecasts

► Update continuously

► Layers and information can be chosen by each user

Forecast bulletins



- ▶ Daily forecasts for 3 to 6 days of the desired parameters
- ▶ Specific forecasts for desired areas
- ▶ Severe precipitations risks
- ▶ Temperature, solid and liquid precipitations
- ▶ PDF layer forecasts per E-Mail for the desired regional locations
- ▶ Optional: risk area and precipitation forecasts on several weather models
- ▶ Optional: online portal with regional meteo maps and PDF data archives

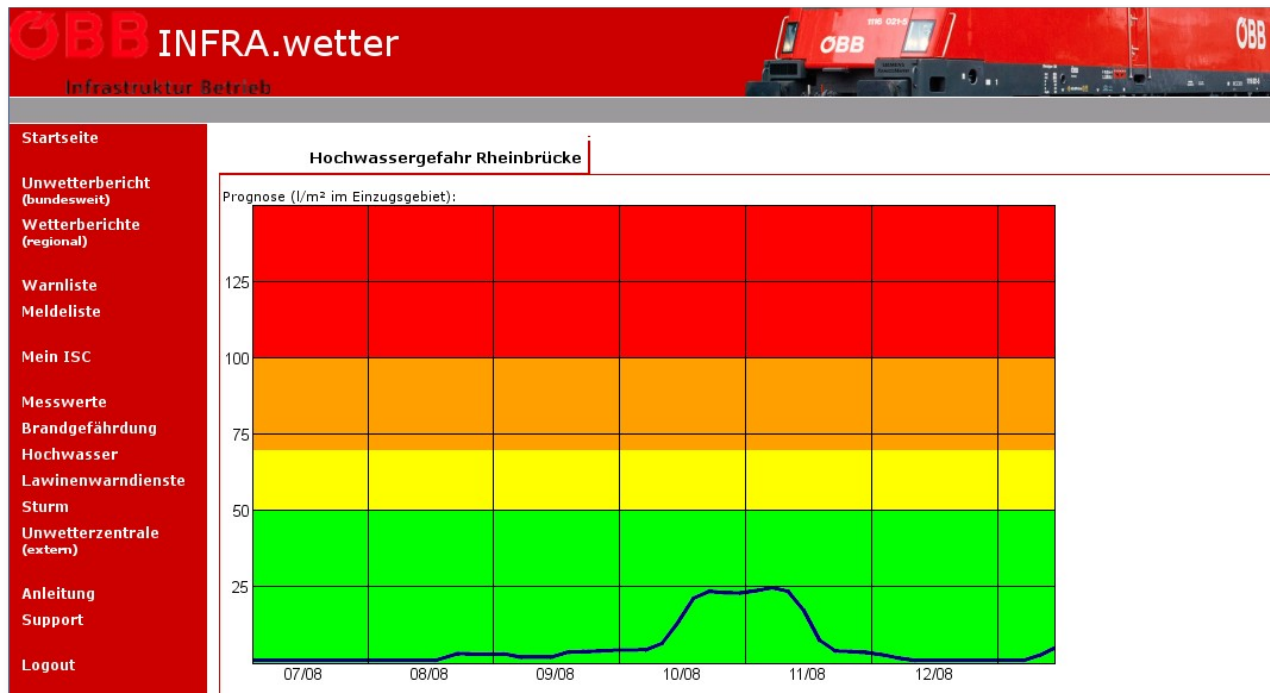


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Floods warning systems

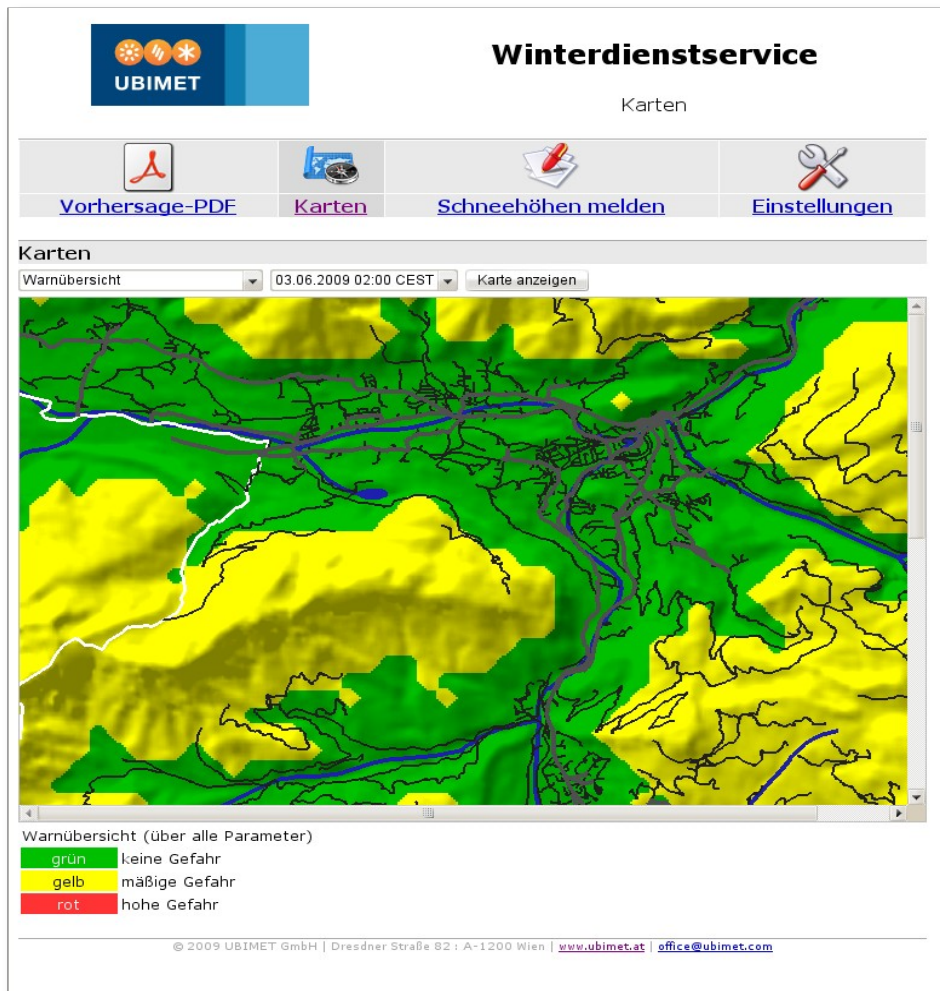
- ▶ 6 days forecasts of the precipitations quantity estimated on a determined area
- ▶ Risk levels correlation
- ▶ The base for the measures plan and level warning systems



Background information

- ▶ Exact delimitation of the catchment zone
- ▶ Warning level definition after the events history.
- ▶ Considering the solid precipitation, too. (freezing level).
- ▶ Integration in already given informatic meteo systems

Risk Forecasts



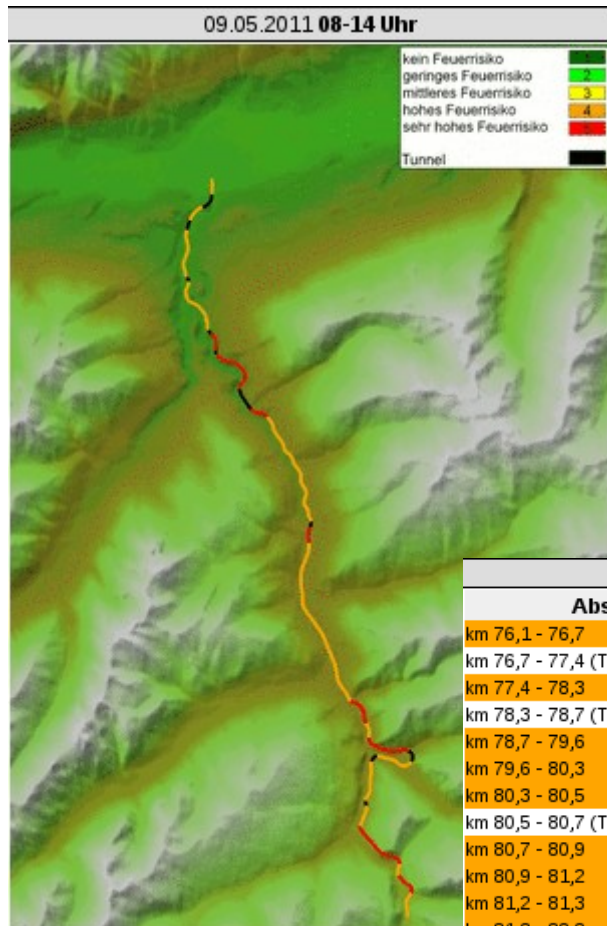
- ▶ Based on the warning levels
- ▶ Intervals 0-3 days, max. 7 days
- ▶ Update: 3-6 hours
- ▶ E.g.. fresh snowfall:
 - ▶ Green: no snowfall
 - ▶ Yellow: Traces of fresh snowfall
 - ▶ Orange: 1 to 5 cm fresh snowfall
 - ▶ Red: 5 to 15 cm fresh snowfall
 - ▶ Violet: 15 to 30 cm fresh snowfall
 - ▶ White: more than 30 cm fresh snowfall



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Track Analyses and Forecasts



- ▶ Daily reports of possible weather-related problems for the first train of the day on remote tracks
- ▶ Analysis of whether the rail network has been affected by severe thunderstorms, high wind speeds or flooding
- ▶ Train crew is informed of potential problems and temporary speed restrictions > increased safety

09.05.2011 08-14 Uhr

Abschnitt	Brandgefahr
km 76,1 - 76,7	hohes Risiko
km 76,7 - 77,4 (Tunnel)	-
km 77,4 - 78,3	hohes Risiko
km 78,3 - 78,7 (Tunnel)	-
km 78,7 - 79,6	hohes Risiko
km 79,6 - 80,3	hohes Risiko
km 80,3 - 80,5	hohes Risiko
km 80,5 - 80,7 (Tunnel)	-
km 80,7 - 80,9	hohes Risiko
km 80,9 - 81,2	hohes Risiko
km 81,2 - 81,3	hohes Risiko
km 81,3 - 82,2	hohes Risiko
km 82,2 - 82,8	hohes Risiko
km 82,8 - 83 (Tunnel)	-
km 83 - 83,2	sehr hohes Risiko
km 83,2 - 83,7	sehr hohes Risiko

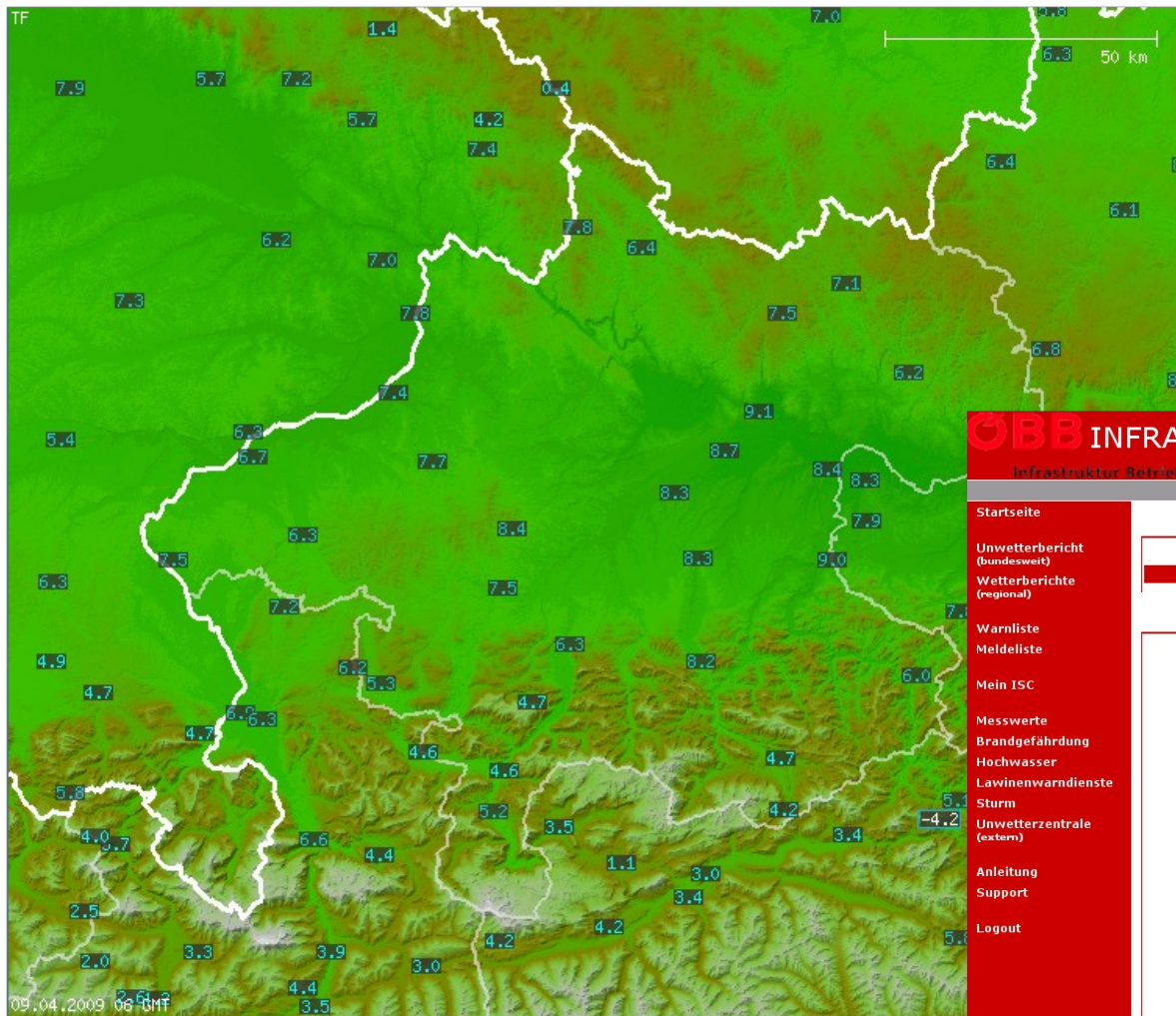
- ▶ Other analyses and forecasts, such as fire risk along the rail tracks, are widely used by national railways in Europe



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Actual measured data



- ▶ Hourly measured data from all the public and UBIMET weather stations
- ▶ Temperature, precipitation, wind
- ▶ Estimating the fresh snowfall rates (evaluation of the temperature, humidity and the fresh snowfall quantity)

OBB INFRA.wetter
Infrastruktur Betrieb

Auswahl

Österreich	Burgenland	Kärnten	Niederösterreich	Oberösterreich
Salzburg	Steiermark	Tirol	Wien	Vorarlberg

Karte (09:00h)

Datum/Zeit Auswahl
25.08.2009 09:00 Uhr OK

Parameter Auswahl

Temperatur	
rel. Feuchte	
Taupunkt	
Windrichtung	
Niederschlag	
Niederschlagssignal	
Windmittel	
Windböen	
Schneehöhe	

Stundendaten
25.08.2009 08:00 Uhr (-1 Stunde)
Aktuell
25.08.2009 10:00 Uhr (+1 Stunde)

Minutendaten
09:00 09:10 09:20 09:30 09:40 09:50

Name: Untervindau (ISC West)
Typ: OBB A-Messnetz
Hersteller: Logotronic
Betreuung: UBIMET

Temperatur: 14.8°C
Windrichtung: 11
Windgeschw.: 1km/h
Windböen: 5km/h
rel. Feuchte: 82%
Niederschlag: 0l/m²
Niederschlagssignal: 0min



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Weather stations

Senzor meteo compact



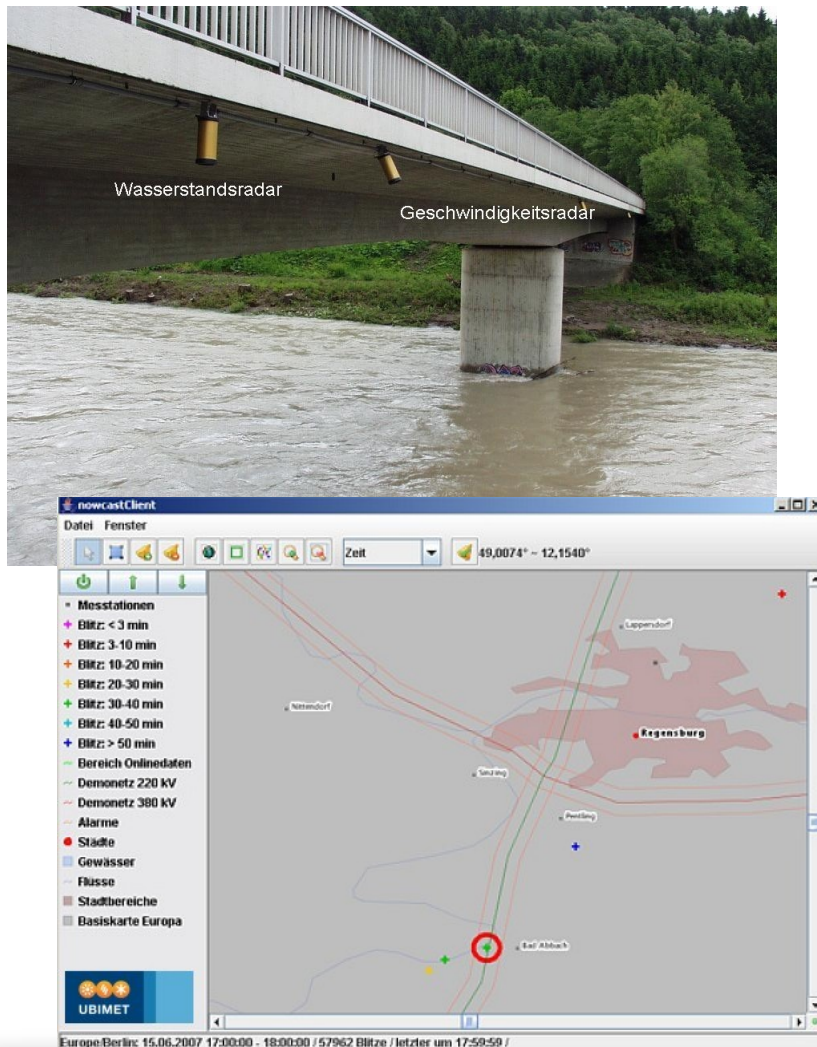
- ▶ Weather stations for the critical network parts
- ▶ SMS warning in the case of snowfall and black ice
- ▶ Actual measured data (10 minutes) and history (diagrams)
- ▶ Secured data transmission via GPRS
- ▶ Last generation sensors:

Laser sensor for precipitations



- ▶ Precipitation measured by laser and radar
- ▶ Wind measured by ultrasound
- ▶ Snow thickness measured by laser
- ▶ Experienced for years by UBIMET

Alert Systems for Railways



- ▶ UBIMET leads the field in developing **severe weather warning systems**
- ▶ **Alarm systems for flooding**, for instance at bridges, allowing tracks to be closed at the accurate time (see picture on the left)
- ▶ **Early warning system for widespread flooding and flash floods**
- ▶ **Lightning detection and storm prediction systems** (see graphic on the left)
- ▶ Alerts are sent **within minutes** via sms (mobile phone text messages), e-mail, telephone calls, fax...



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Warning Center



- ▶ Powered 24/7 by specialized meteorologists
- ▶ Severe events analyzed by **5 meteorologists simultaneously**
- ▶ **Experienced meteorologists** check and send the warnings
- ▶ **Redundant** systems and own logistic for the data transmission
- ▶ **Decentralized warning systems** – warnings transmitted actively and online to the customers



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UBIMET severe weather warnings



- ▶ **UBIMET sends individual warnings at the zipcode or geo-coordinates**
 - ▶ Warnings for **heavy rain, heavy snowfall, hail, storm/hurricane, black ice**
- ▶ **No automatized warnings**
 - ▶ Each warning is **created by a specialized meteorologist**
- ▶ **Warnings are sent in time per SMS or E-Mail** if any severe weather event is expected
 - ▶ Warnings reach the customer with **15 minutes to 48 hours before the event takes place**
- ▶ **You decide to whom what warning for which location is sent**



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Warnings Advantages



► High spatial resolution

- Very precise delimitation of the damaged areas (zipcode or geo-coordinate level)



► Exact Information

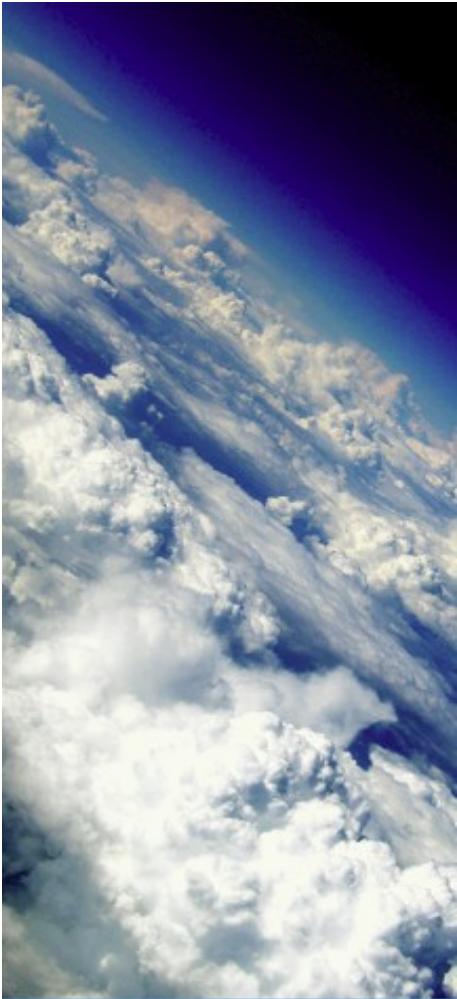
- Precise time delimitation of the event
- Warning levels determined by prefixed values



► High precision active transmission

- Transmission made through an own logistic system

UBIMET Advantages



- ▶ **The largest private weather service** with long experience in infrastructure, industry and public institutions
- ▶ **More models and special precipitation models** compared to other weather services
- ▶ Complete Online-Meteoportals & data archives
- ▶ **Forecast technology** and **warning systems** verified along the years
- ▶ Own research and development department which provides services at the highest technical level
- ▶ Long experience in installing and maintaining the weather stations
- ▶ Know-how in severe weather warnings through the development of the **Severe Weather Competence Center**



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**For questions and additional
information do not hesitate
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