The warning system of ZAMG for Austria **Concept and Applications**

he warning of extreme meteorological events is a core task of ZAMG, the national weather service of Austria. Meteorological parameters such as windstorm, heavy rain, heavy snow, icing phenomena, thunderstorm and hail are covered by the highly sophisticated warning system of ZAMG. Warnings for thunderstorms and hail are also automatically transmitted to special clients by SMS. These warnings are based on a special technique detecting the 3-dimensional radar signal.

The operational warning system of ZAMG consists of 3 components

- Warnings for districts according to the federal alarm centres of Austria. public information transfer via internet portal
- Warnings for specified local areas, e.g. cities or industrial locations, special clients, information transfer via SMS
- Warnings for mobile local destinations, e.g. hikers in the mountains, information transfer via GPS (under development, project Galimet)



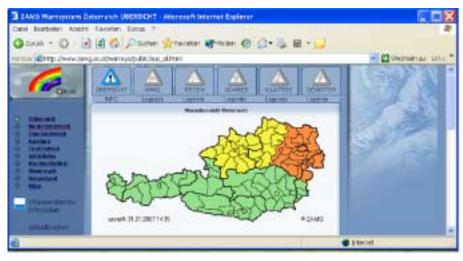
For warnings to the public and federal alarm centres, the responsibility lies with the forecasters at the headquarters of ZAMG and at the regional offices of ZAMG in Salzburg, Innsbruck, Graz and Klagenfurt. The warnings for specified local areas for heavy rain, snow and windstorm are based on forecaster information already in the warning system and on the predicted values of the combined mesoscale model system INCA-ALADIN (INCA = Integrated Nowcasting through Comprehensive Analysis, ALADIN = operational mesoscale forecasting model of se http://www.zamg.ac.at/fix/INCA system.doc). The warnings for thunderstorm and hail for special clients are automatically generated. Warnings for mobile local destinations will be operated in conjunction with a telecommunication provider.

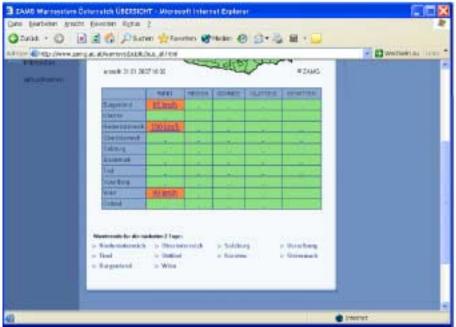
The general warnings are presented in the public domain on the homepage of ZAMG (www.zamg.ac.at)

The warnings areas relate to the political districts over the territory of Austria.

By clicking on a district where a warning is in force, a popup specifies the warning period and contains further information within a detailed short text. The warning period for the public lasts no more than 24 hours. This page also contains a trend warning for the next two days.

The warning system of ZAMG has utilised some ideas from the French vigilance system, especially the colour definitions: green, yellow, orange and red. The Austrian philosophy in distributing a warning is determined by the principles in standardisation of alarm levels in relation to climatological data and areas. The colour of the warnings for the public represent how often the warning parameters of wind, rain and snow occur per year in each district. Green represents no warning, yellow less than 18 times per year, orange less than 4 times per year and red less than 2 times per 3 years. For thunderstorms, hail and icing phenomena, the colour is linked to the magnitude of the event. The Austrian warning tool of ZAMG runs operationally but further developments are planned. It is also compatible and integrated into the European Multi-service Meteorological Awareness system (EMMA), operating formally as METEOALARM.







What does that mean for a risk management strategy to public authorities?

Yellow means damage is possible to exposed objects, orange represents frequent damage and red identifies large scale damage.

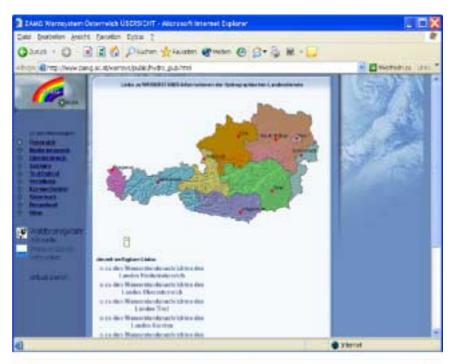
What does that mean to the public?

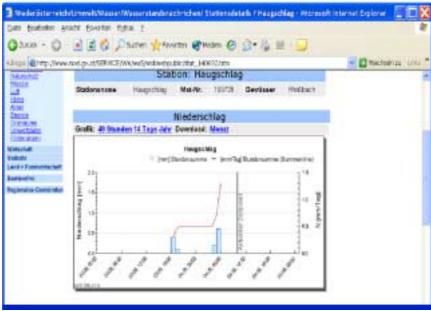
Yellow informs the public to be alert, orange to be very alert and red to follow the advice of the public authorities. Identified special clients do not need to constantly monitor their screen with this integrated internet portal. They are informed by SMS, email or fax if there is a change on the warning system.

At ZAMG a crucial verification method has been developed in order to evaluate the warnings in space and time. An example for wind in shown below for the period May 2005 - July 2006 over the counties of Lower Austria. Vienna and **Burgenland:**

Not detected: 13 %, false alarm rate (overwarning): 30%, preliminary warning time: 6,5 hours. The detection rate and false alarm rate are dependent on the frequency of warnings, density of the observation network and the orography of Austria. Links to flood information operated by the hydrological services of each county are included on the ZAMG homepage.

Special warnings for heat waves, drifting snow and snow load are inserted in the warning pages by an 'attention pictogram'. The warnings for forest fire are provided in a special page on ZAMG homepage. Warnings for avalanches are not operated by ZAMG. A link to this service is in preparation.





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