



No snow in Styria



Snow chaos in Italy, Slovenia and Croatia

## Communication of ZAMG's highest warning level

- In February 2015 existed a potential heavy snowfall event in the southeast of Austria
- On the basis of ECMWF model a red warning was issued on the ZAMG-website
- At the end the measured precipitation in the alerted region of Austria was far below every warning threshold
- The forecasters had to deal with several differences between the model runs
- What lessons can we learn?

### 1. General synopsis and warning situation

- At the beginning (2 Feb. 2015) Austria was in the middle of a mighty trough with transit of several trough axis
- During the following days the trough lost his structure, a cut-off-process took place
- On Friday, 6 Feb. 2015, Austria was nearly exact within the border area of a ridge over the Atlantic and the cut-off-low in a southeasterly upper flow.

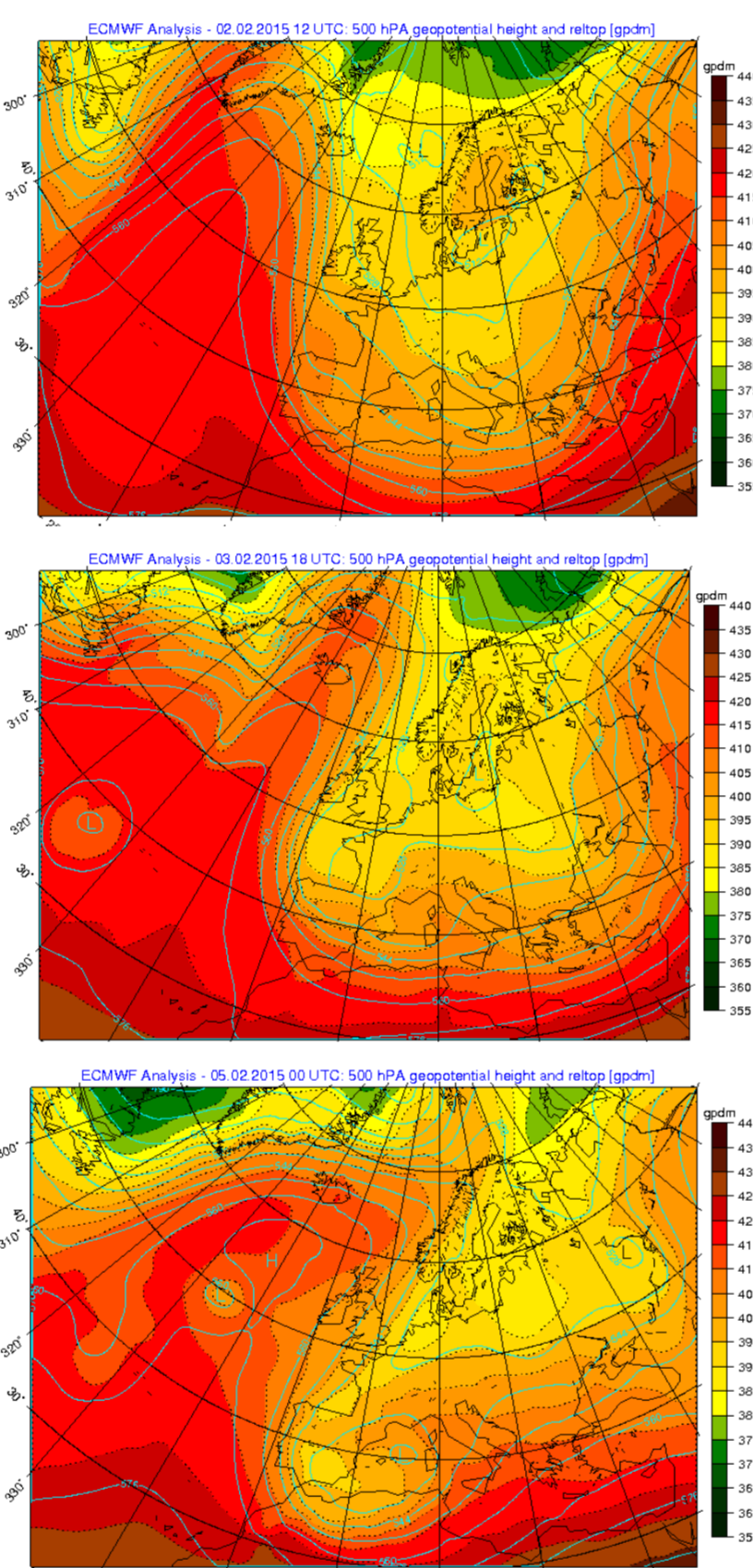
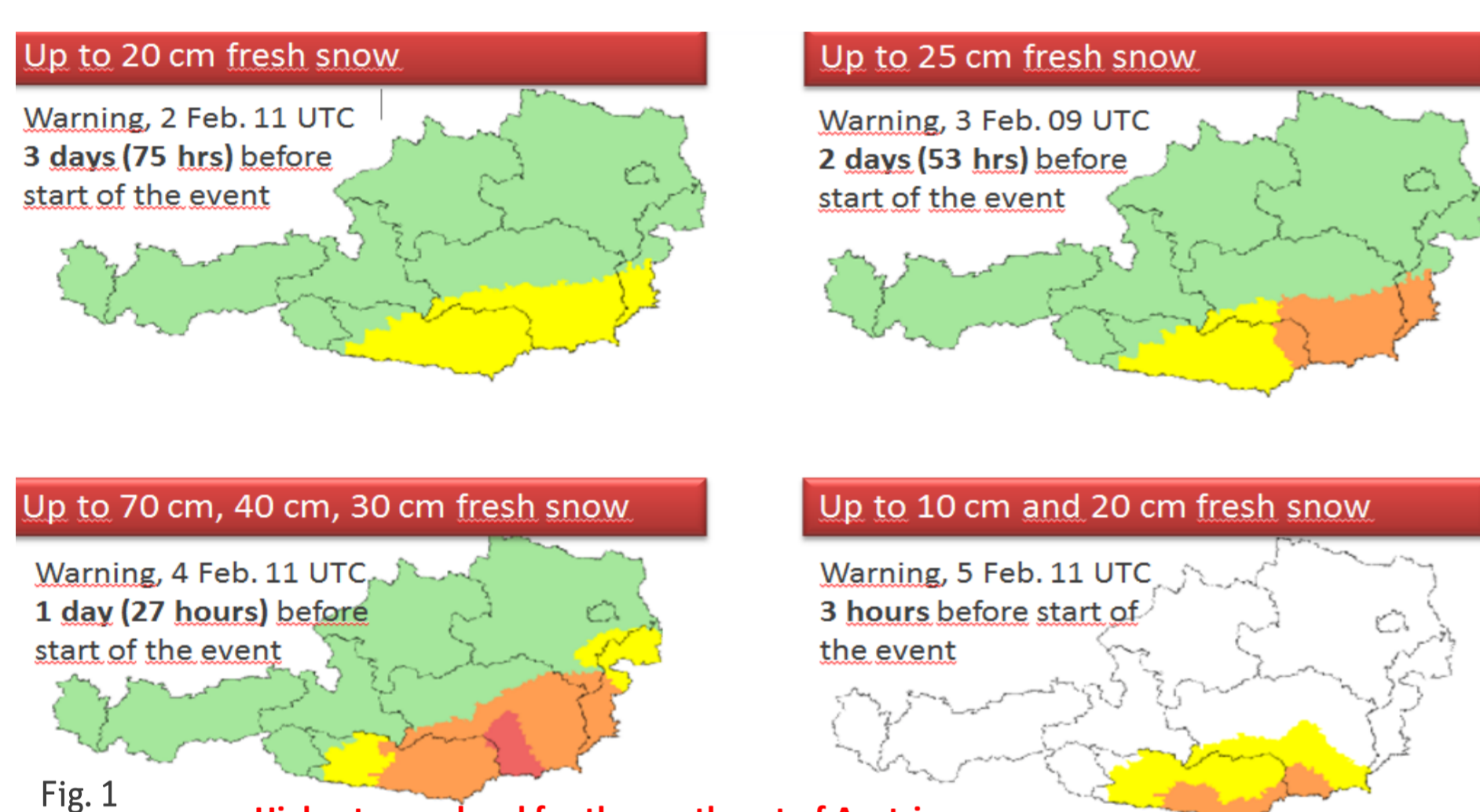


Fig. 2: 500 hPa analysis

### 2. Forecast jumpiness

#### ENSgrams of precipitation Capital Graz

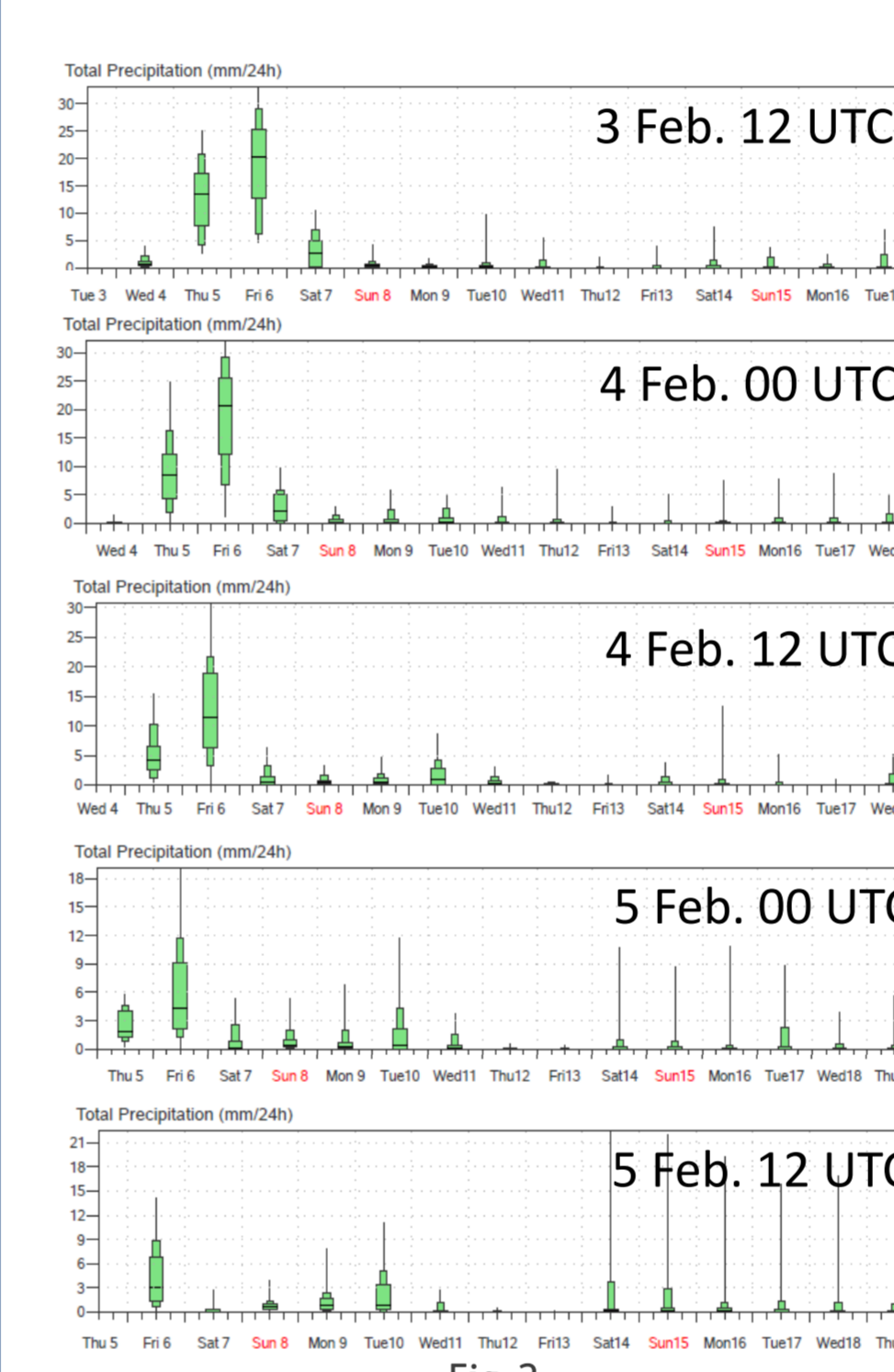


Fig. 3

#### ECMWF HRES 24hour accumulated precipitation, 3-5 Feb 2015

Over the 4 days in advance it shows the drift of the main precipitation toward Italy Croatia and Slovenia

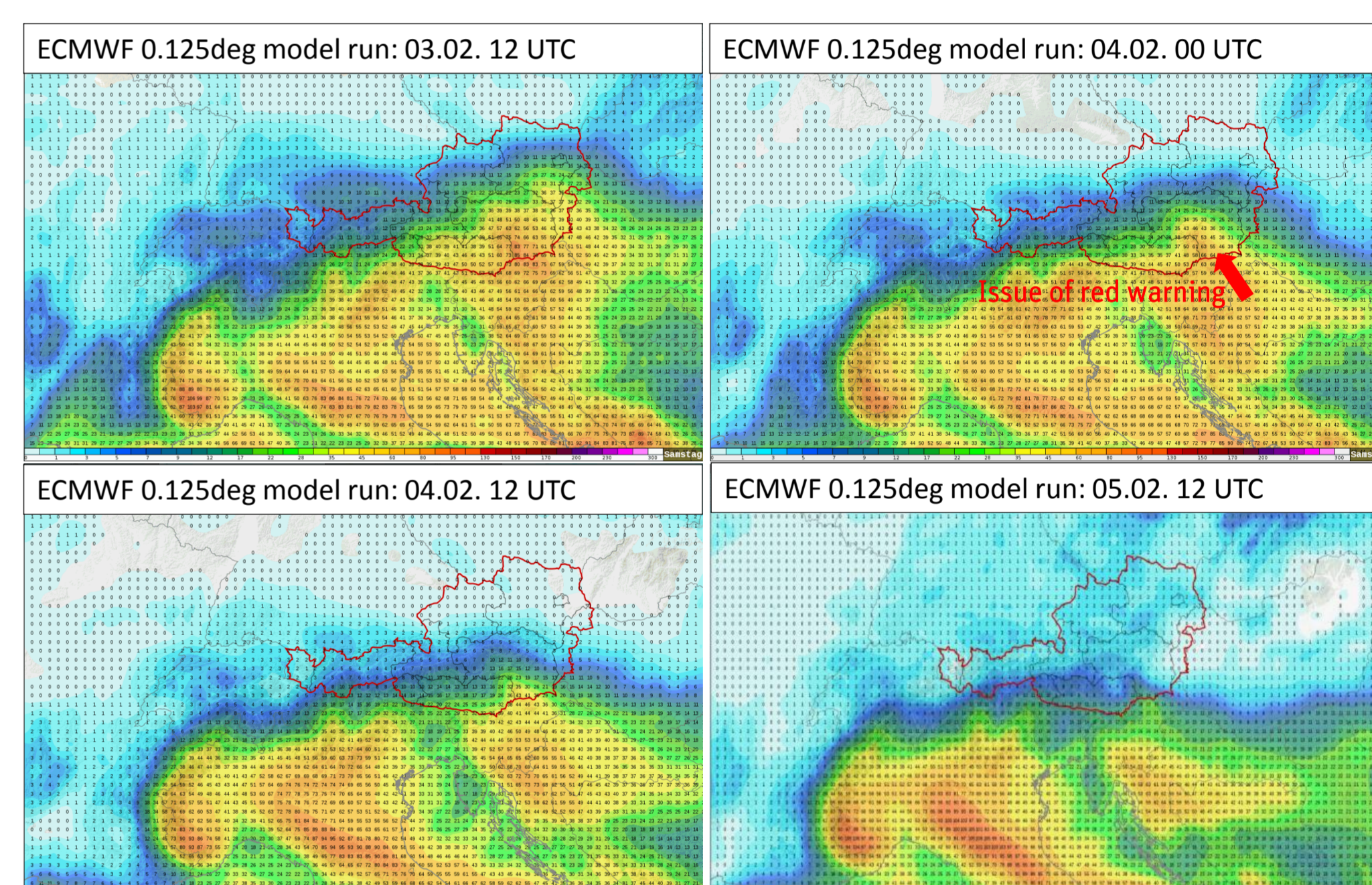


Fig. 4

On 3 Feb. the forecasters in Styria discuss the issue of „red“ for the first time. For the warning period, ENS-median showed about 16 mm, the day after even 40 mm.

### 3. Summary of the outcome

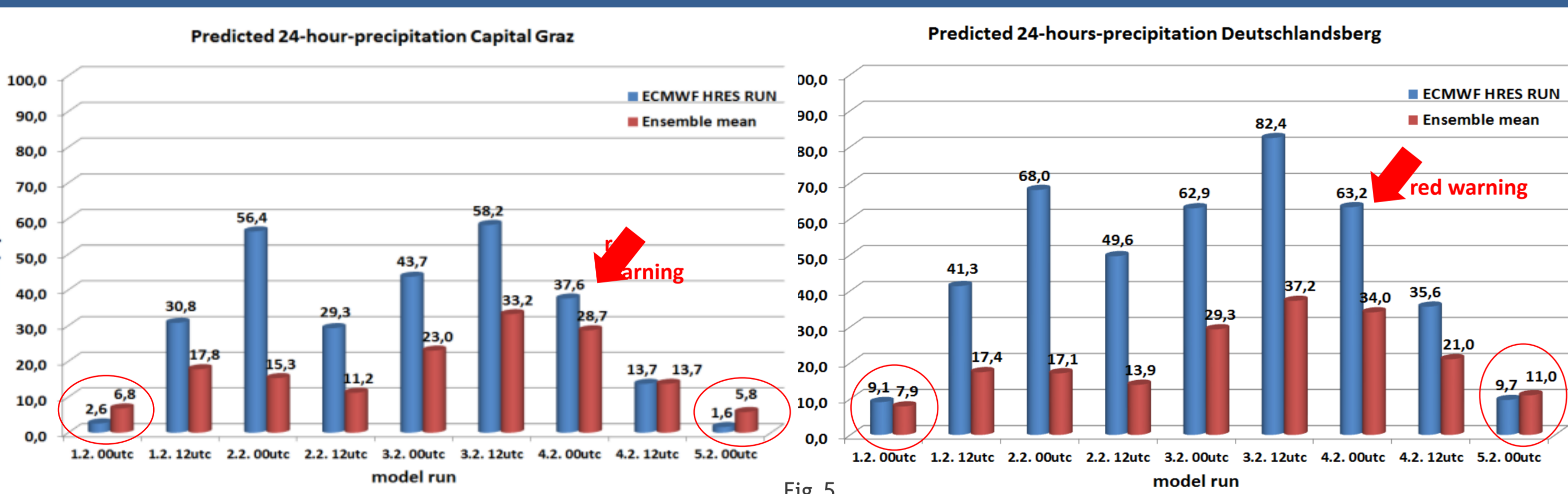


Fig. 5

Measurements 5-7 Feb. 2015	
Capital Graz (AUT)	0,3 mm
Deutschlandsberg (AUT)	1,3 mm
Karlovac (CRO)	58 mm
Zagreb (CRO)	21 mm
Novo Mesto (SLO)	47 mm

Tab. 1

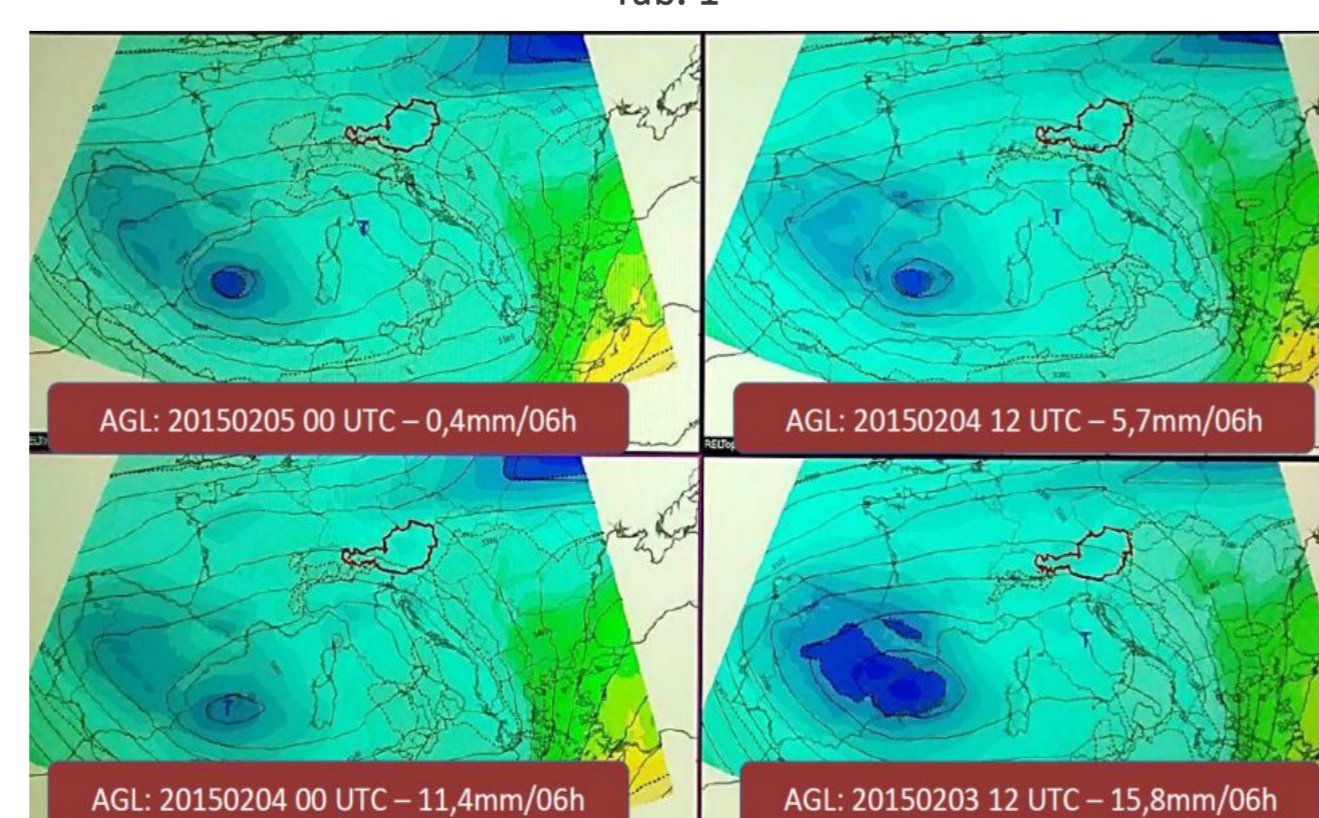


Fig. 6

- High potential for heavy snowfall, but the maximum of precipitation was finally 150 km southward between Slovenia, Croatia and Italy (Fig 4, Tab. 1)
- Little differences between the lows led to big differences in the forecast
- Between 24 and 36 hours in advance (average time interval for issuing warnings) the potential for an extreme weather situation was very high (ECMWF global and local models, GFS)
- In the end, the measured precipitation amounts were **mostly far below of nearly all ensemble-members** (Fig. 3, Tab. 1)
- Particularly interesting: The model run (HRES and mean) 4 days in advance, was in nearly the same precipitation scale as the model run which was nearest to the event and the actual measurements

### 4. Consequences and conclusion

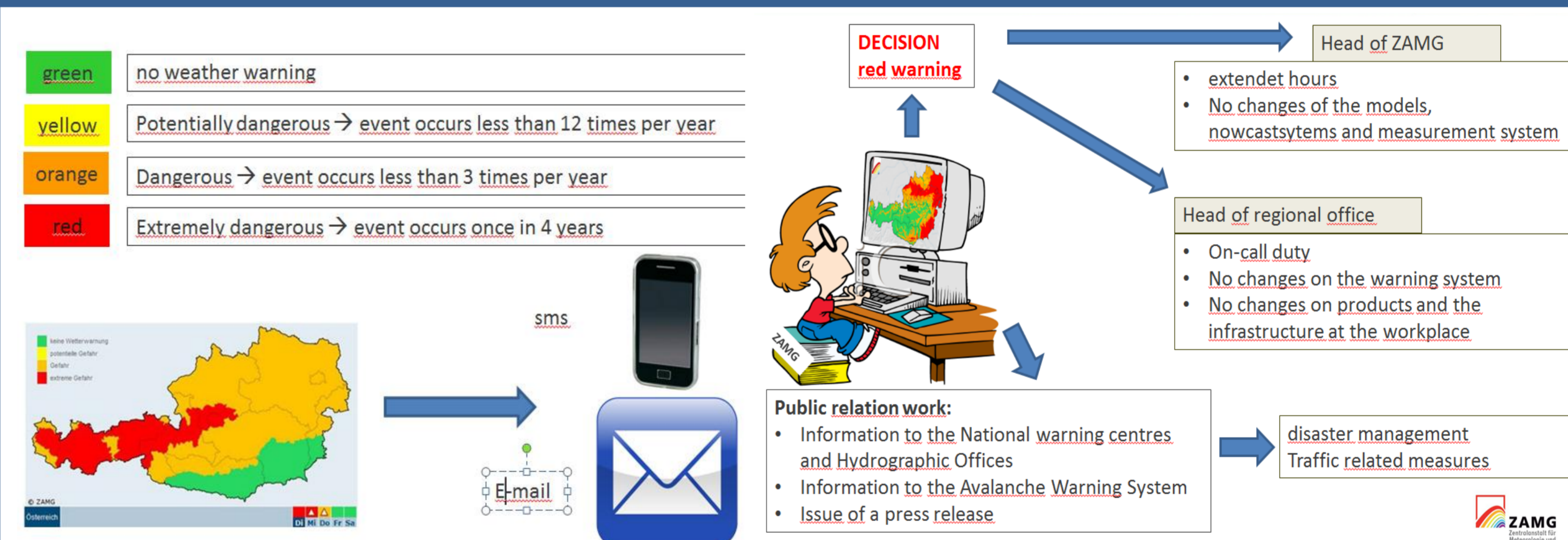


Fig. 8: procedure in case of red warning

#### Warnings in the Alpine Region require caution:

- Impacts of certain synoptik situations should be valued differently. E.g. small-scale pressure systems round the Mediterranean (Fig. 6) or larger synoptic system like occlusions from the north or northwest (Fig. 10).
- In case of temporary, local and quantitative differences between the various models the issue of warnings (especially red ones) should be delayed as long as possible.
- Care is also required concerning warnings for very small areas as we had in the case of Styria
- Occlusions in combination with stau effects are easier to evaluate because of the occurrence of precipitation in more extensive areas

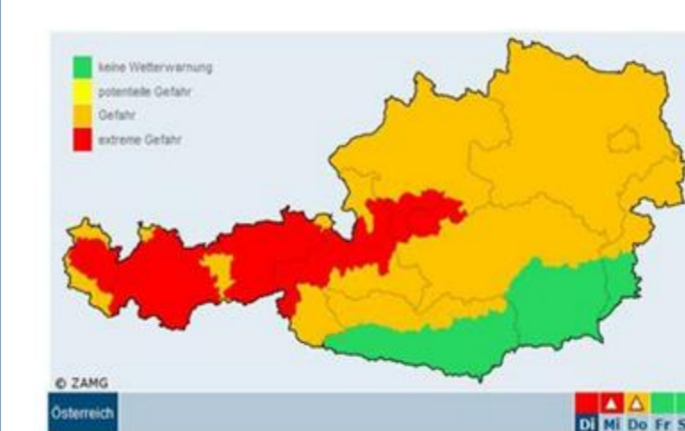


Fig. 7: Color system of ZAMG warnings

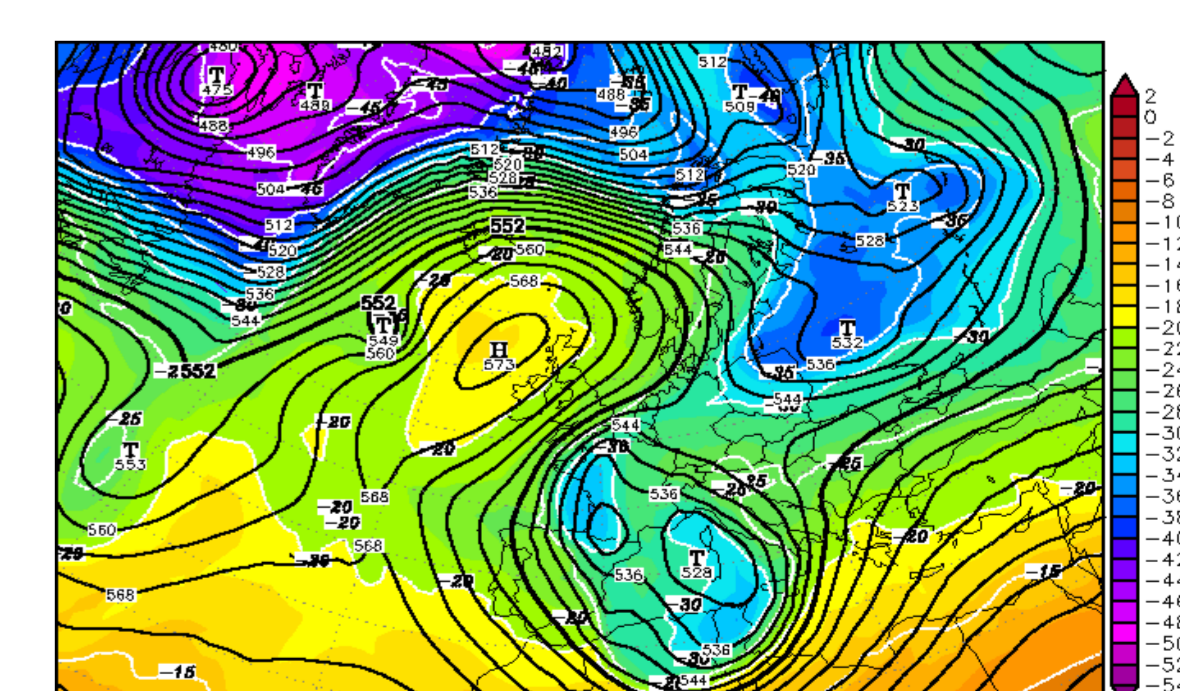


Fig. 9: GFS analysis, 5 February 18 UTC

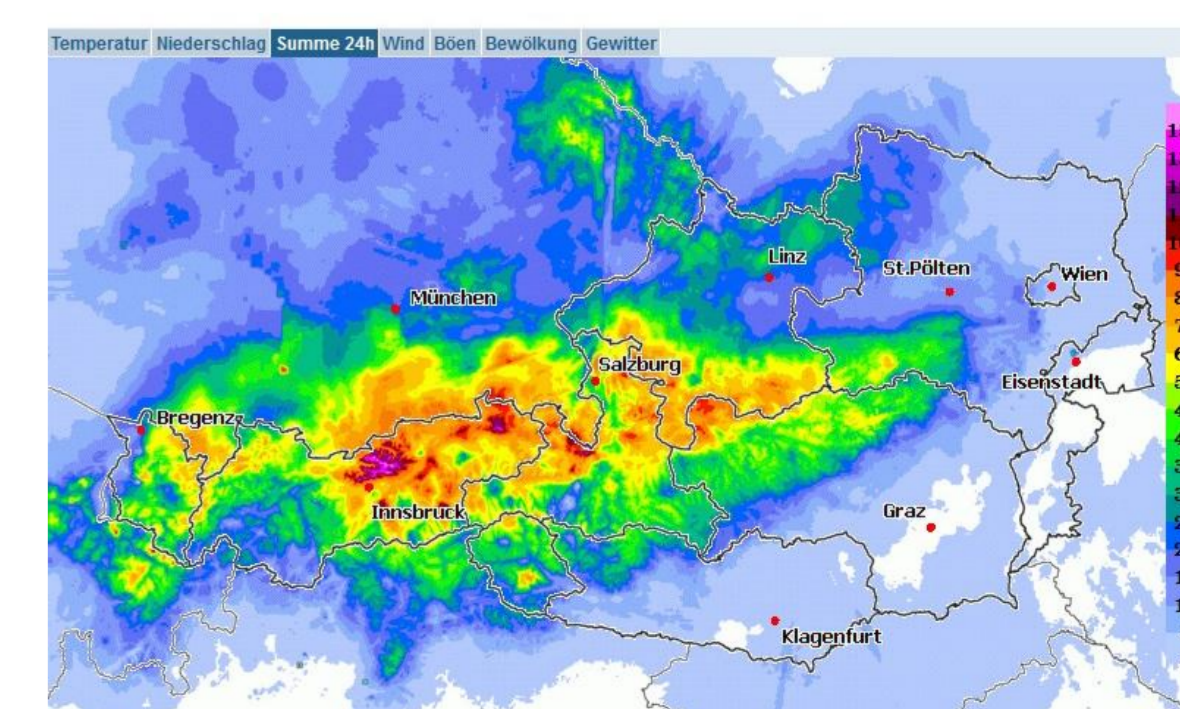


Fig. 10: precipitation of an occlusion from north