ZAMG
Zentralanstalt für
Meteorologie und
Geodynamik

Promising project to use additional probabilistic information for medium and longer time ranges at ZAMG

- Description of the project
- Case studies to illustrate the strength and problems of the existing operational clustering systems
- What can we learn from the case studies?
- Plans for the near future

1. Brief description of the project

In 2010 we started a cooperation with the Hungarian Meteorological Service. They had already developed a clustering method based on ECMWF model for Central Europe. With the help of Istvan Ihasz, special thanks for his great support, we made clustering information available for our forecasters at ZAMG.

The aim of the project is to implement different probabilistic model information in our forecast chain to support our costumers in their decision making process by providing them with accurate weather information and giving them ideas about the (un)certainty of the expected weather phenomena, too. We also try to find out if there is a correlation between the probabilistic model performance and the synoptic situation and/or the scale of the weather phenomena. The first step was to display the different probabilistic information (Hungarian Clustering System, operational ECMWF Clustering System, experimental algorithm of the ECMWF Clustering System with a different parameter setting done by ZAMG) in the same manner, which is shown in Figure 1.
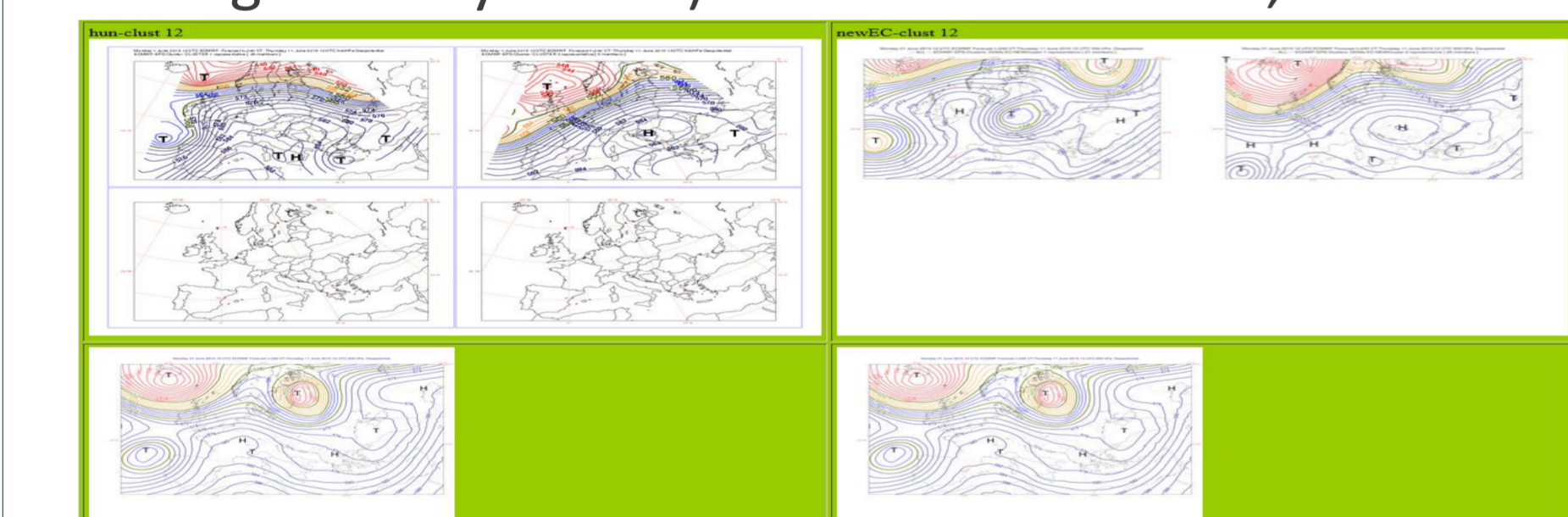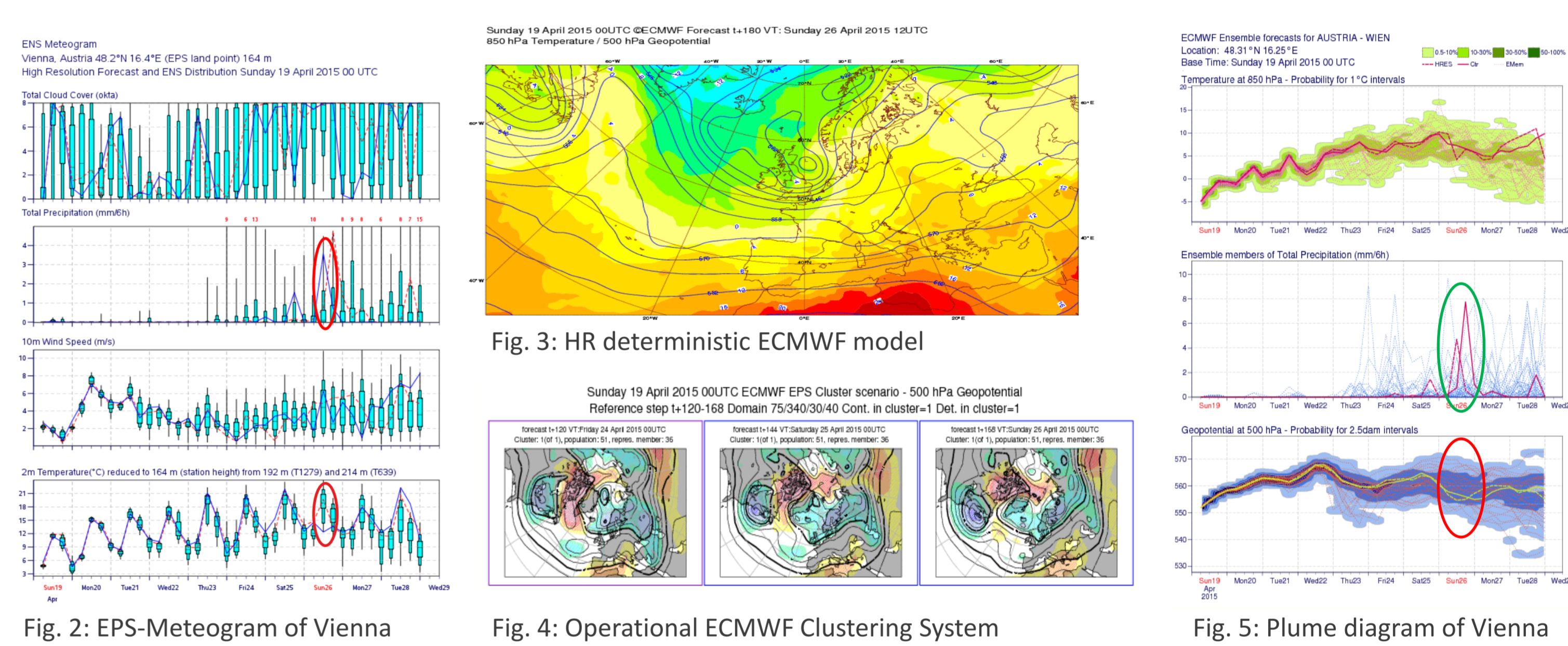

Figure 1: Hungarian (left image on the top) and ECMWF (right image on the top) Clustering System.

2. Benefits from ECMWF clustering system

Fig. 2: EPS-Meteogram of Vienna

Fig. 3: HR deterministic ECMWF model

Fig. 4: Operational ECMWF Clustering System

Fig. 5: Plume diagram of Vienna

- Forecast from April 19 for April 26, 2015
- Deterministic run: trough over Austria (wet and rather cold)
- Ensemble: SW flow over Austria: warm and dry
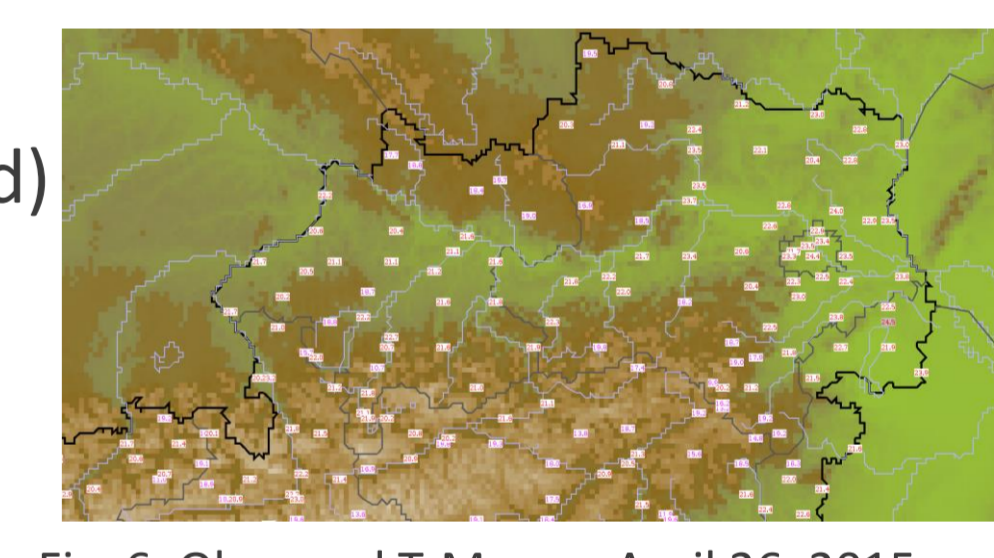
➡ Ensemble information giving correct signal !

Fig. 6: Observed T-Max on April 26, 2015.

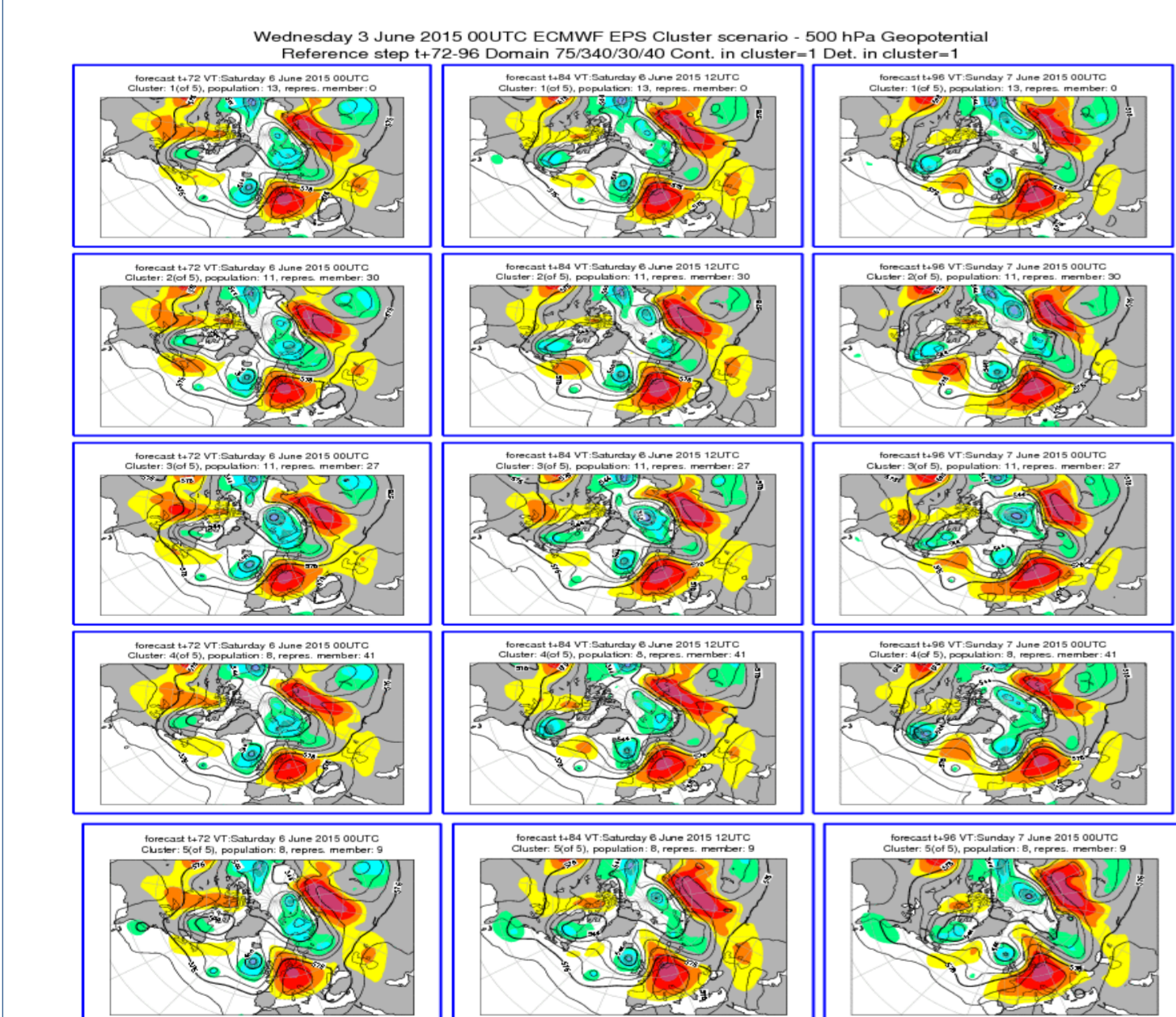## 3. Problems with EZMWF clustering system

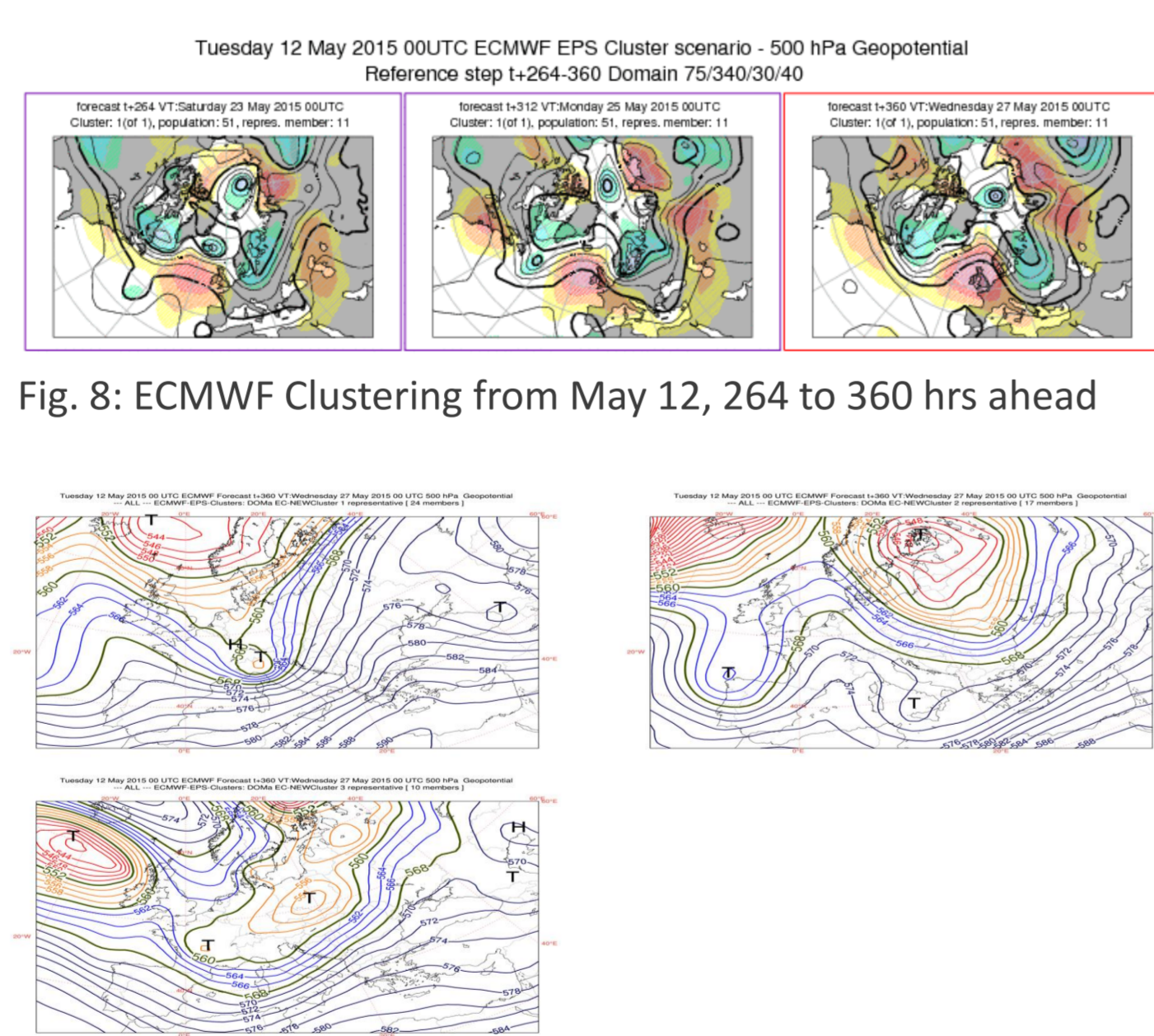Fig. 7: ECMWF Clustering from June 3 for the next 72 to 96 hrs

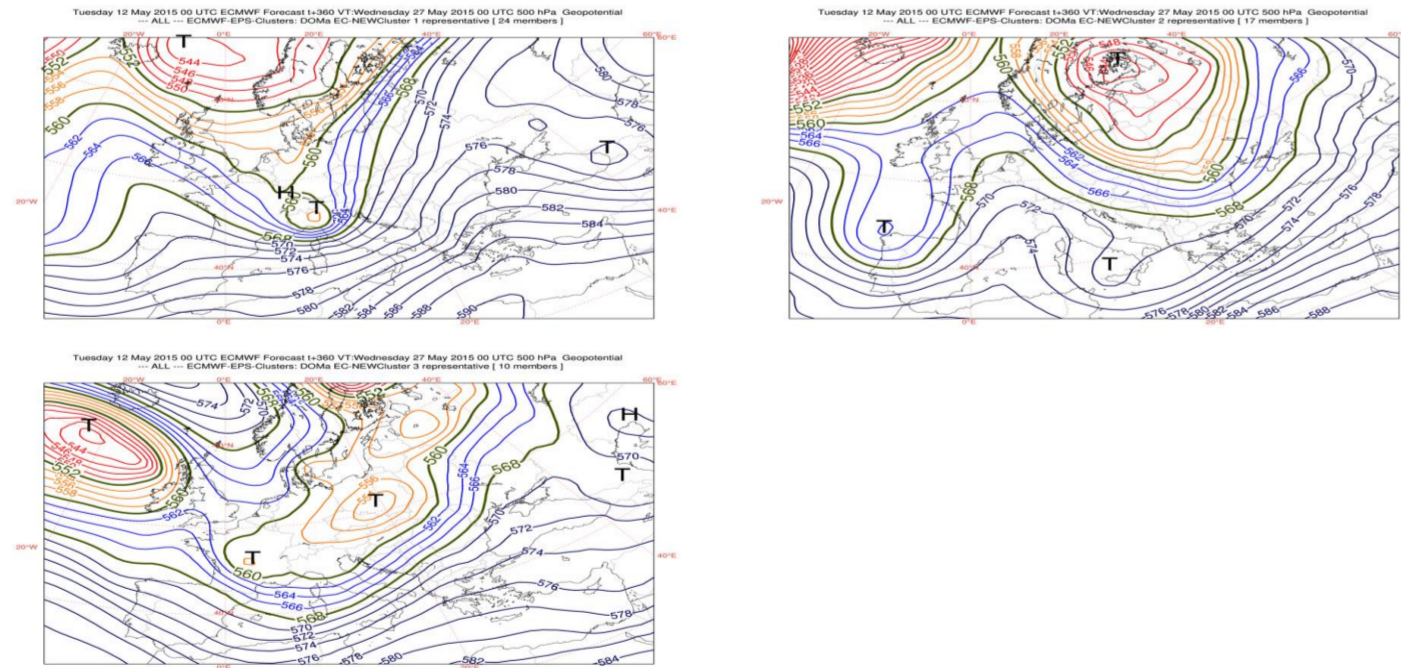Fig. 8: ECMWF Clustering from May 12, 264 to 360 hrs ahead

Fig. 9: Experimental version at ZAMG from May 12, 360 hrs ahead

Problems of the operational ECMWF clustering system:

- large number of clusters, but similar weather scenarios (see Fig. 7): especially for forecasts 72 to 168 hrs ahead

- Too large spread: clustering algorithm will abort ➡ only one cluster (see Fig. 8)
  Suggestion: such situations should be flagged to avoid confusion !
  [in our experimental version we usually have more than 1 cluster (see Fig. 9)]

4. Conclusions and plans for the future

- Clustering information very useful for forecasters at ZAMG

- Experimental ECMWF clustering algorithm: new parameter setting has to be tested regularly and not only for case studies

- Continuous comparison of the Hungarian, operational ECMWF and experimental ECMWF clustering system with the analysis

- Questionnaire/Feedback from the forecasters: qualitative rating of the various clustering systems (jumpiness of the systems from 00 UTC to 12 UTC and vice versa, differences in the predicted weather scenarios between the systems, etc.)

- Implementation of all clustering information in our visualisation system Visual Weather

- Additional meteorological parameters from the representative member of the clusters (now we use Z500, T850 and accumulated precipitation amount) necessary

- Development of new products for our costumers

Thank You very much for Your attention!

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