Experiences on using VAREPS products at the Hungarian Meteorological Service

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Topics

- 15 day VarEPS introduced at the ECMWF 28 November 2006
- Use of the VarEPS products at the HMS
- Use of the ECMWF Monthly Forecasts at the HMS
- Use of the ECMWF Seasonal Forecasts at the HMS
- EPS Calibration using reforecast dataset
- HAWK-3

15 day VarEPS introduced at the ECMWF
28 November 2006

http://www.ecmwf.int/products/changes/vareps/index.html

This new system is characterized by a variable resolution during the forecast period (higher in early forecast range) instead of a constant resolution like EPS.

Thus, the forecast range covered by VAREPS was extended to 15 days with TL399L62 (day 0-10)
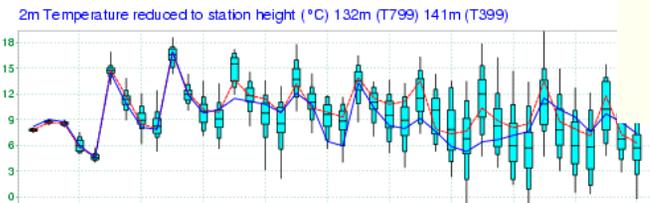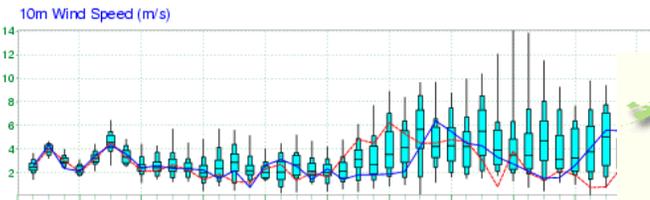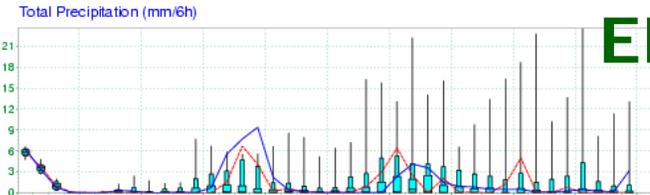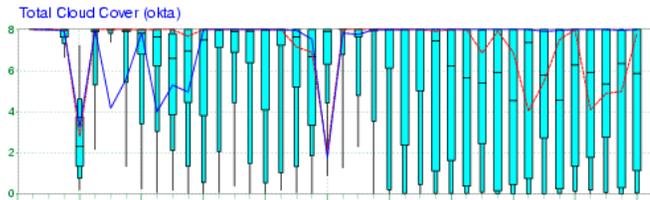
and TL255L62 (day 9-15).

see ECMWF Newsletter No. 108 for more detailed information /Buizza et. al., p 14-19/

http://www.ecmwf.int/publications/newsletters/

Use of the ECMWF VarEPS products at the HMS

ECMWF

EPS meteogram

www.ecmwf.int
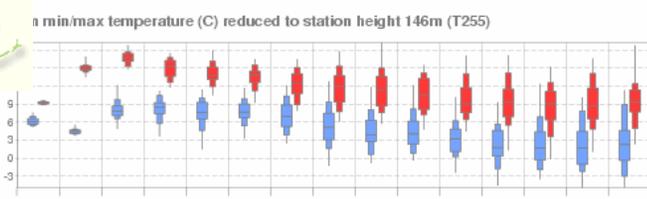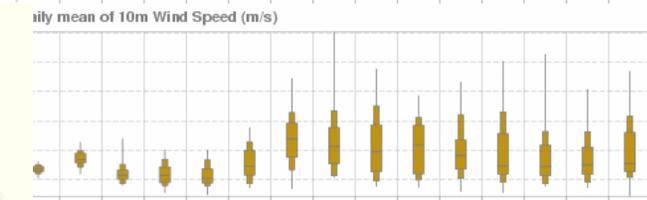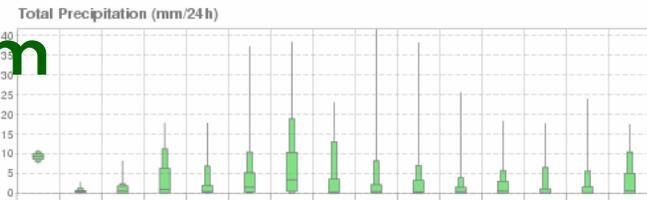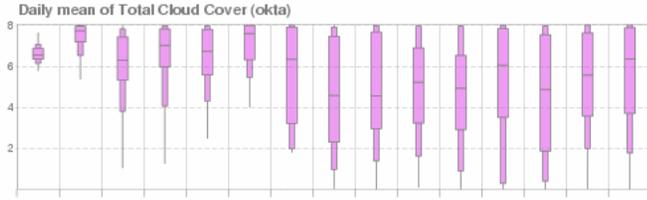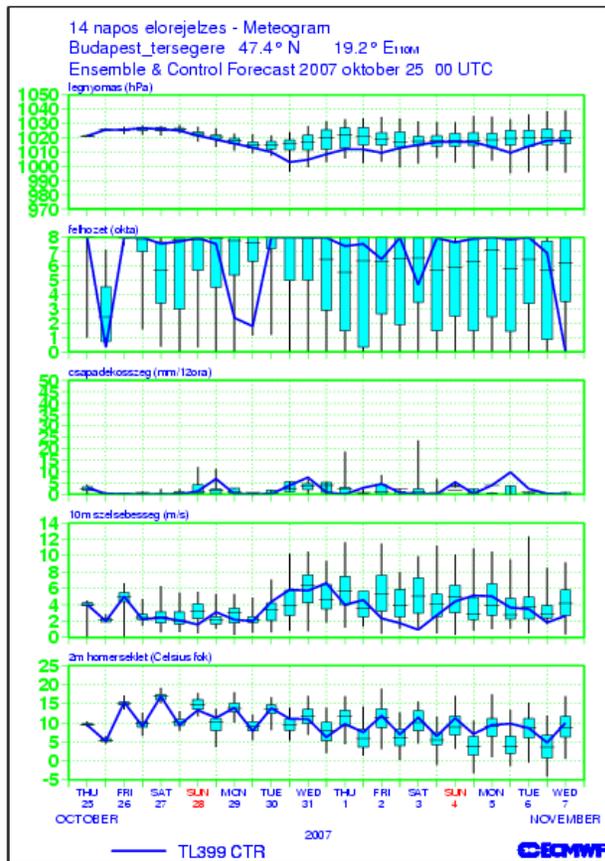
Use of the ECMWF VarEPS products at the HMS (cont)
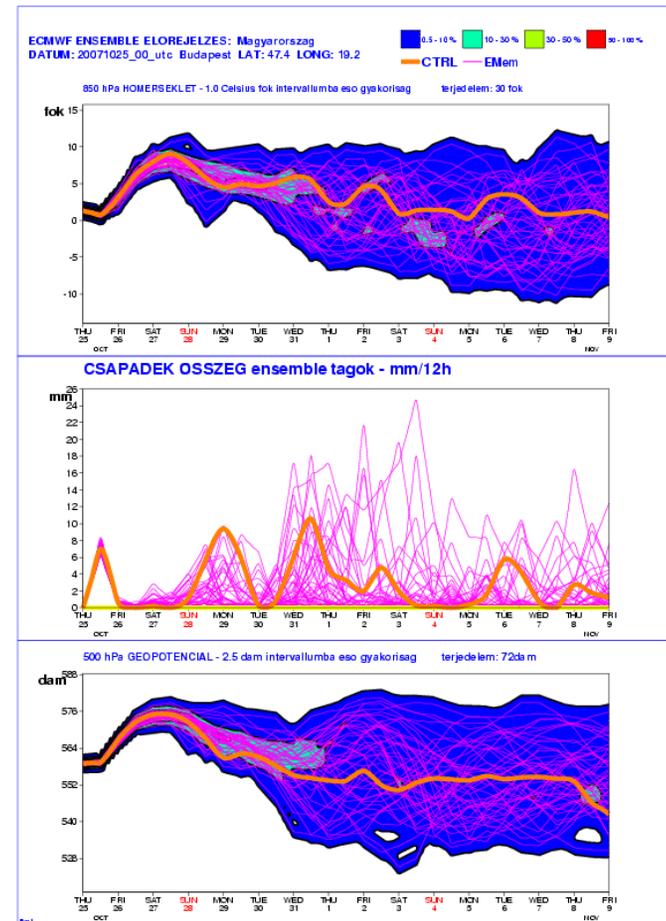
- 50+1 EPS member {fields} / operational /

- EPS mean   {fields}/ operational /

- EPS meteogram   / operational /

- EPS plume   / operational /

- Clustering aims to identify the weather regimes at week two (D 8 – D 15) planned to be developed H1 2008, operational H2 2008

Use of the ECMWF VarEPS products at the HMS (cont)


15 day
meteogram
&
plume
for 10 predefined
points

Use of the ECMWF Monthly Forecasts at the HMS

- Experimental: twice a month since 2002

  (preoperational monthly forecast is avaialable from MARS 1990-2004)

- <u>Operational Monthly Forecast</u> (once a week)

- Available from MARS since October 2004

- Monthly Forecast products in dissemination since May 2005

- EPS meteogram for 10 selected stations on intranet since 2002
- Some special monthly forecasts for external users since 2004
- Bias correction – 2007
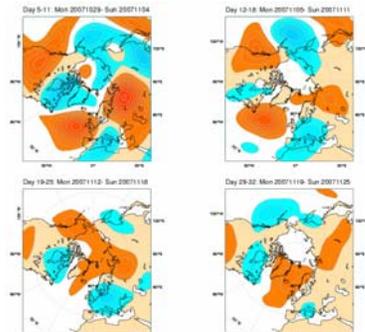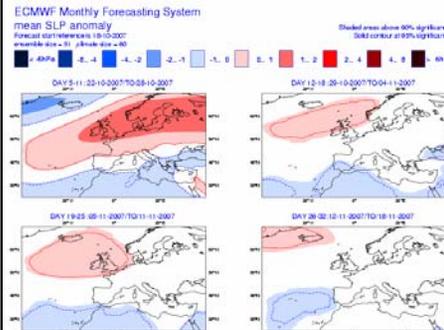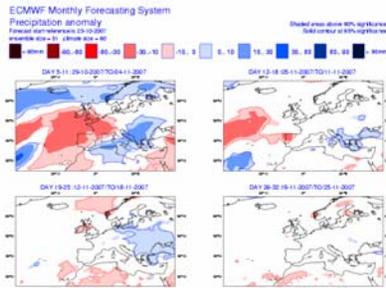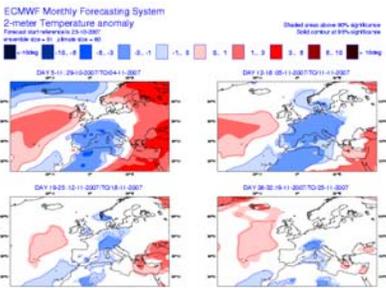- Objective verification /ECMWF green book/

Thanks to: Csilla Molnár

Use of the ECMWF Monthly Forecasts at the HMS (cont)
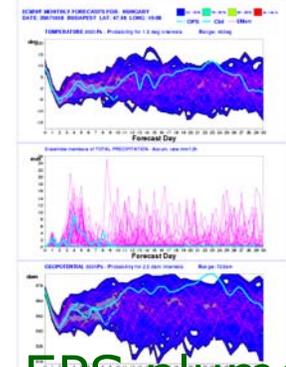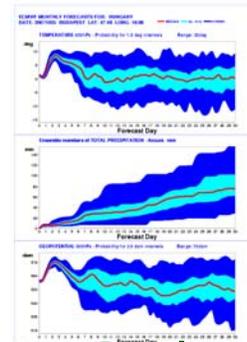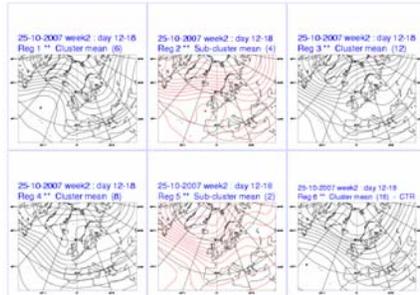
Howmoller
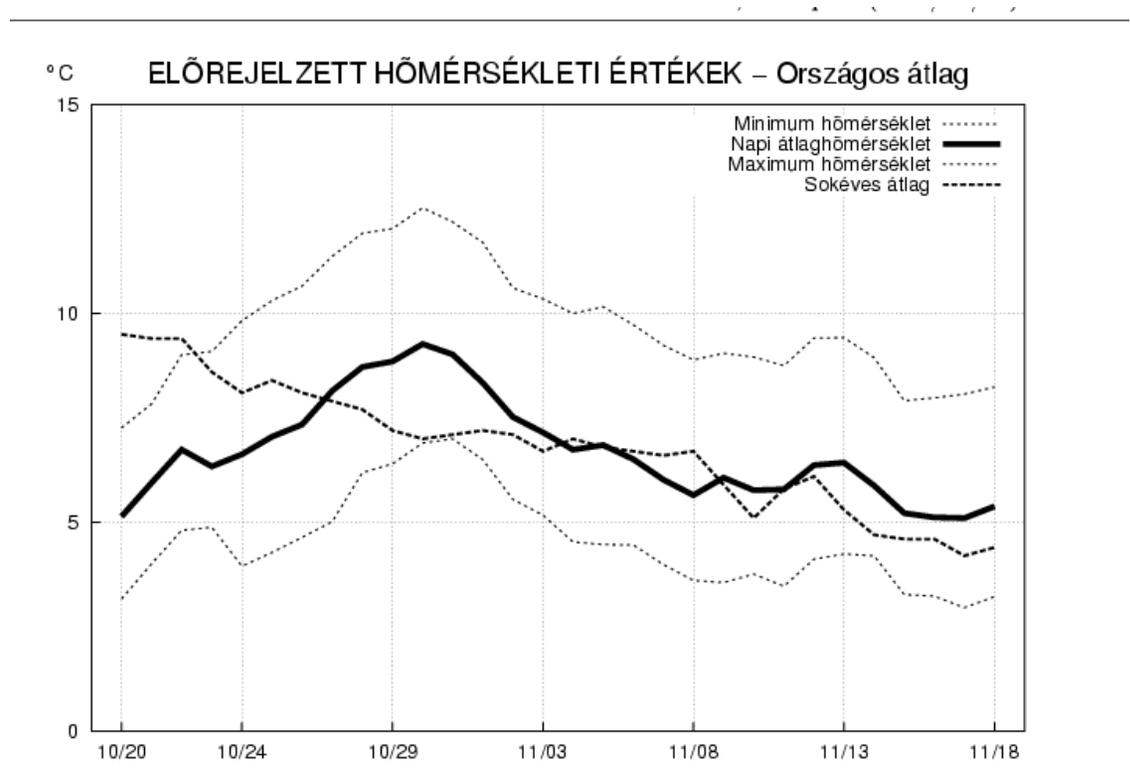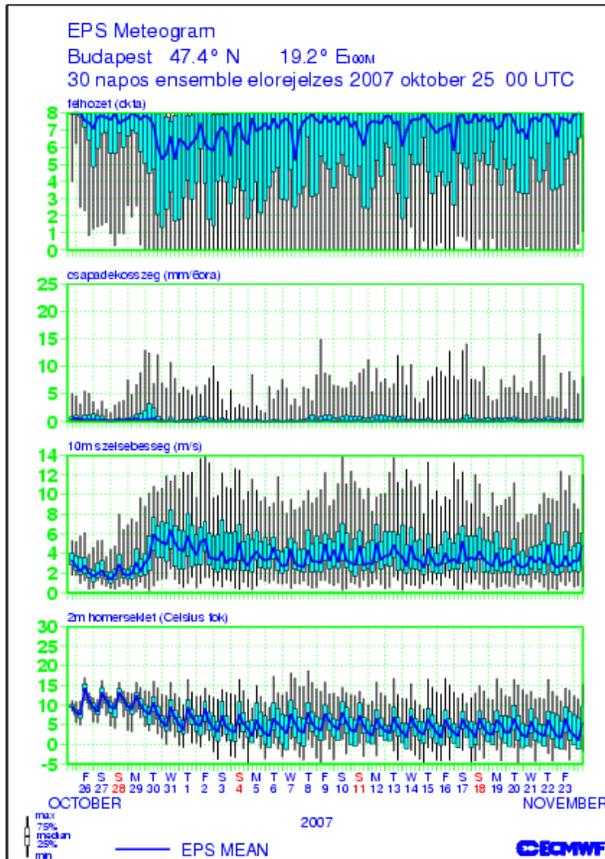
Weakly weather regimes

EPS plume

EPS plume

2m temperature

precipitation

MSLP

zonal flow

Use of the ECMWF Monthly Forecasts at the HMS (cont 1)

Use of the ECMWF Seasonal Forecasts at the HMS

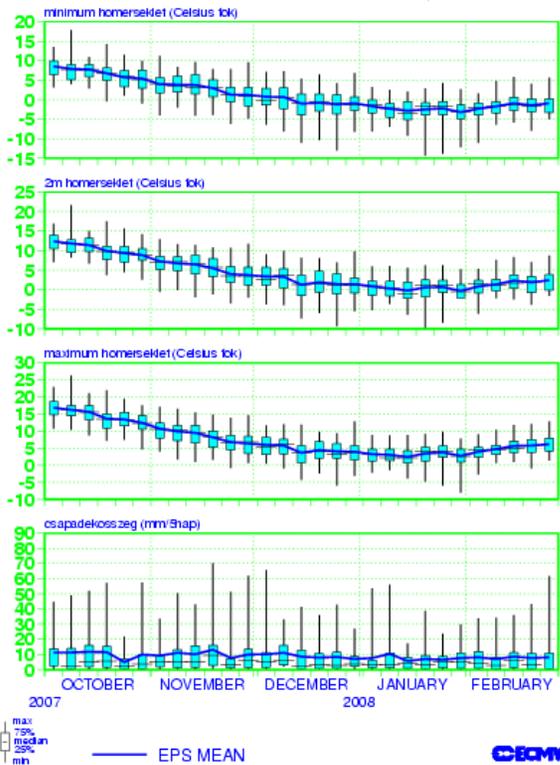http://www.ecmwf.int/products/forecasts/seasonal/documentation/index.html

- **Experimental ECMWF seasonal forecasts since 1998 /System-1/**
- **System-2 – January 2003**
- **Seasonal Forecast Product Dissemination – July 2004**
- **System-3 – March 2007**

- **EPS meteogram for 10 selected stations on intranet since 2003**
- **Bias correction - 2003**
- **Some special monthly forecasts for external users since 2003**
- **Monthly averaged probability maps on intranet since 2006**
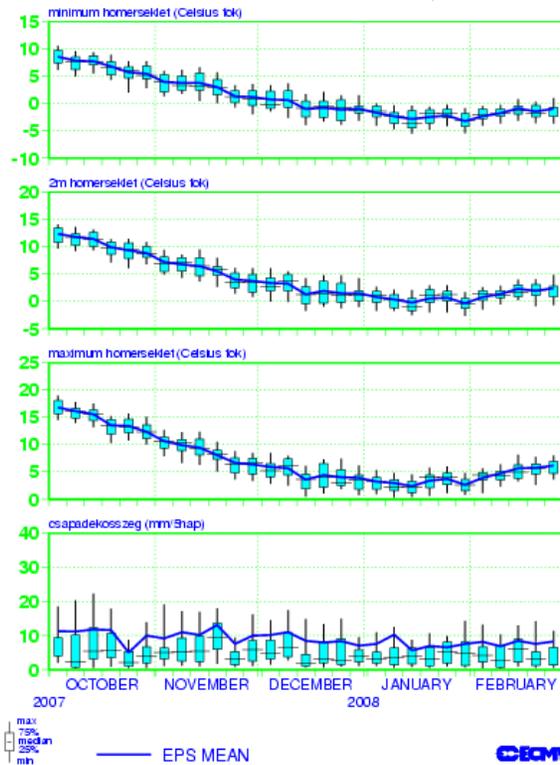- **Objective verification /ECMWF green book/**

Thanks to: Gergő Kiss

OMSZ

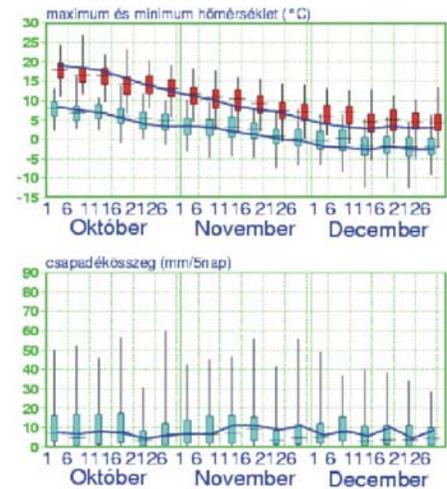# Use of the ECMWF Seasonal Forecasts at the HMS (cont)

Full EPS range /5 month/ 60 % reduced EPS   intranet /3month /
5 day average: 2m min & max temperature, precipitation

Use of the ECMWF Seasonal Forecasts at the HMS (cont 2)

probability charts of the anomalies

Forecast made 15 May 2006 /for June, July & August /

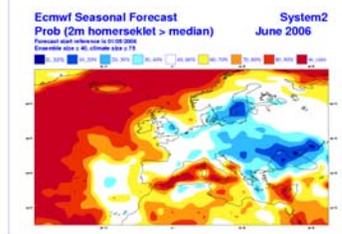|			
3 month average	June	3 month average	
	July		
2m Temperature	August	Precipitation	
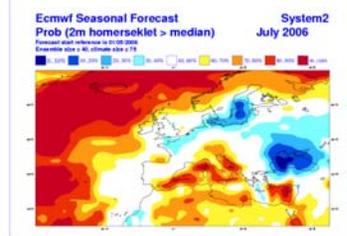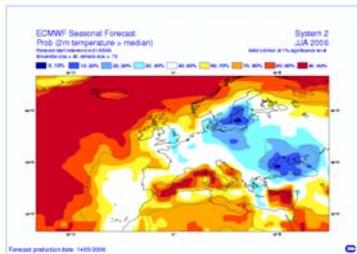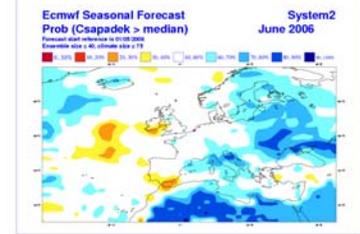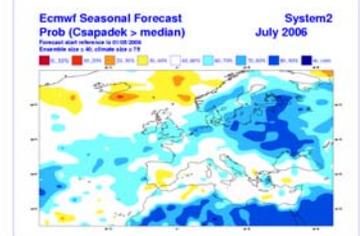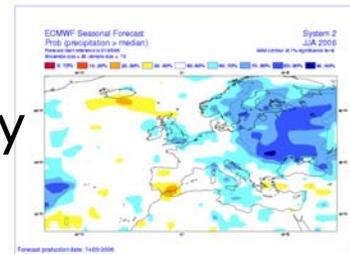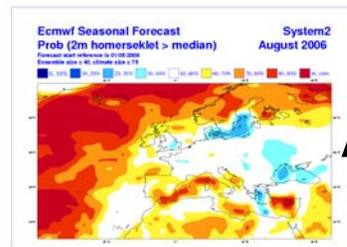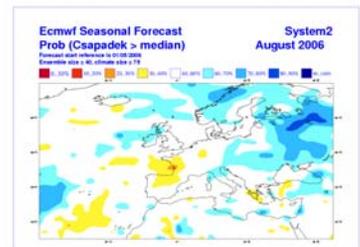
Use of the ECMWF Seasonal Forecasts at the HMS (cont 3)

probability charts of the anomalies

Forecast made 15 October 2007 /for November,December & January /

3 month average	November	3 month average	
2m temperature	December	Precipitation	
	January		
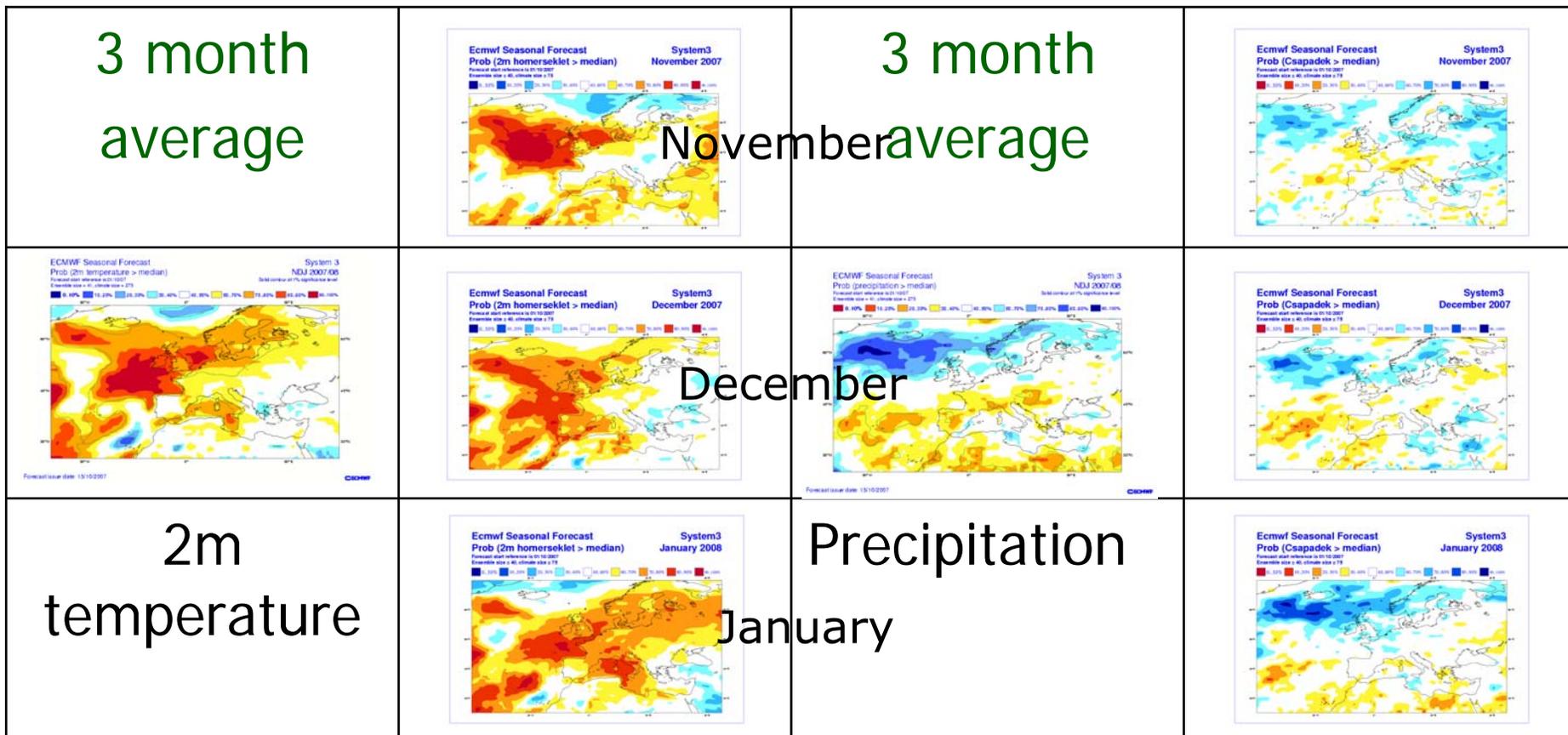
Calibration using reforecast dataset

- Questions on generating model climate

- ECMWF reforecast dataset 1971-2000

- Calibration method, meteorological parameters

- Typical model and observation distributions

- Results, verification

- Plans : VarEPS & Monthly forecasts

Calibration using reforecast Dataset (cont)

- Questions on generating model climate
   - 1. Simple model statistics
    - 2. Reforecast

- ECMWF reforecast dataset 1971-2000
    - +/- 30 days around actual date – control model run up to 48 h

- Calibration method, meteorological parameters
    - 2m temperature at 00, 12 UTC
    - Minimum & maximum temperature
    - Wind speed at 00, 12 UTC
    - 24 h accumulated precipitation

Calibration using reforecast Dataset (cont 2)
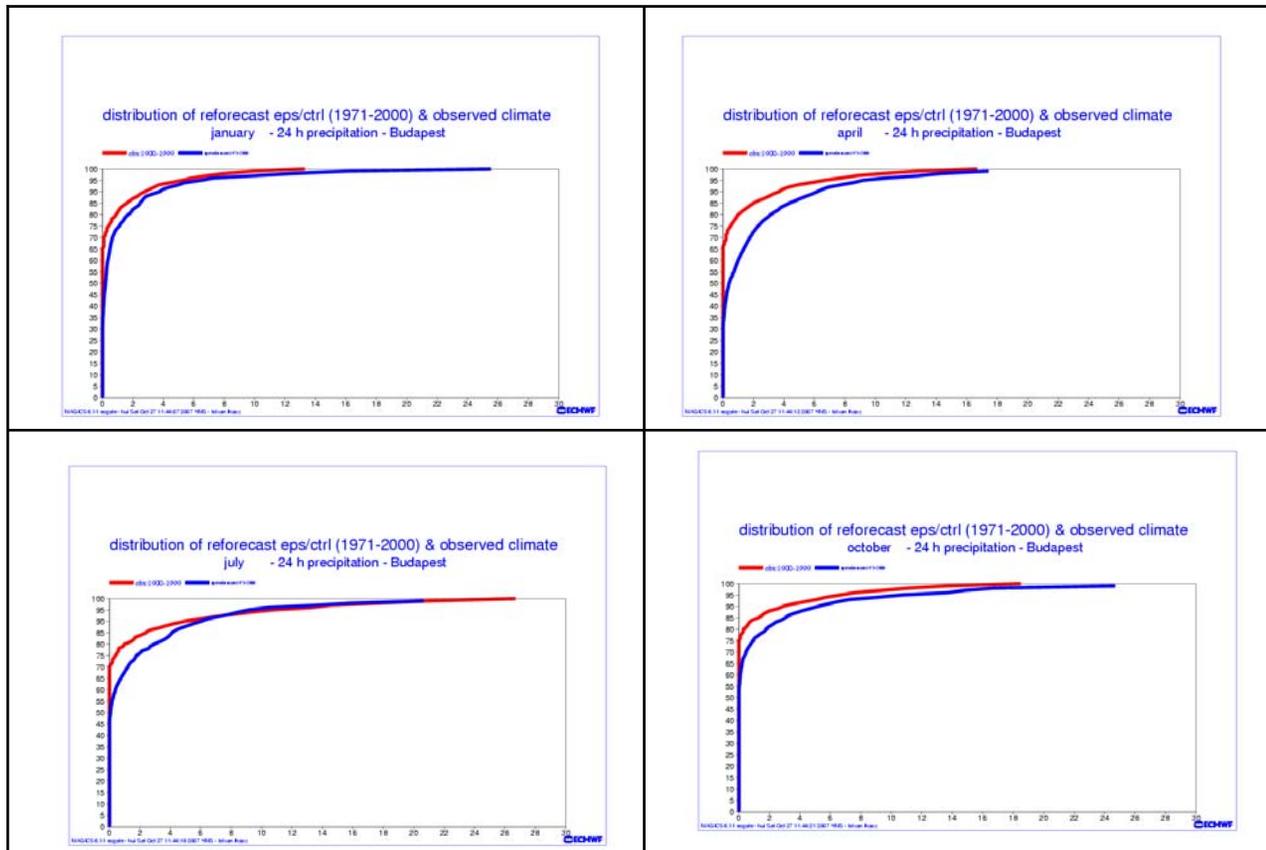
- Typical model and observated climate distributions : Budapest 2m temperature Jan, Apr, Jul, Oct (red obs, blue EPS)
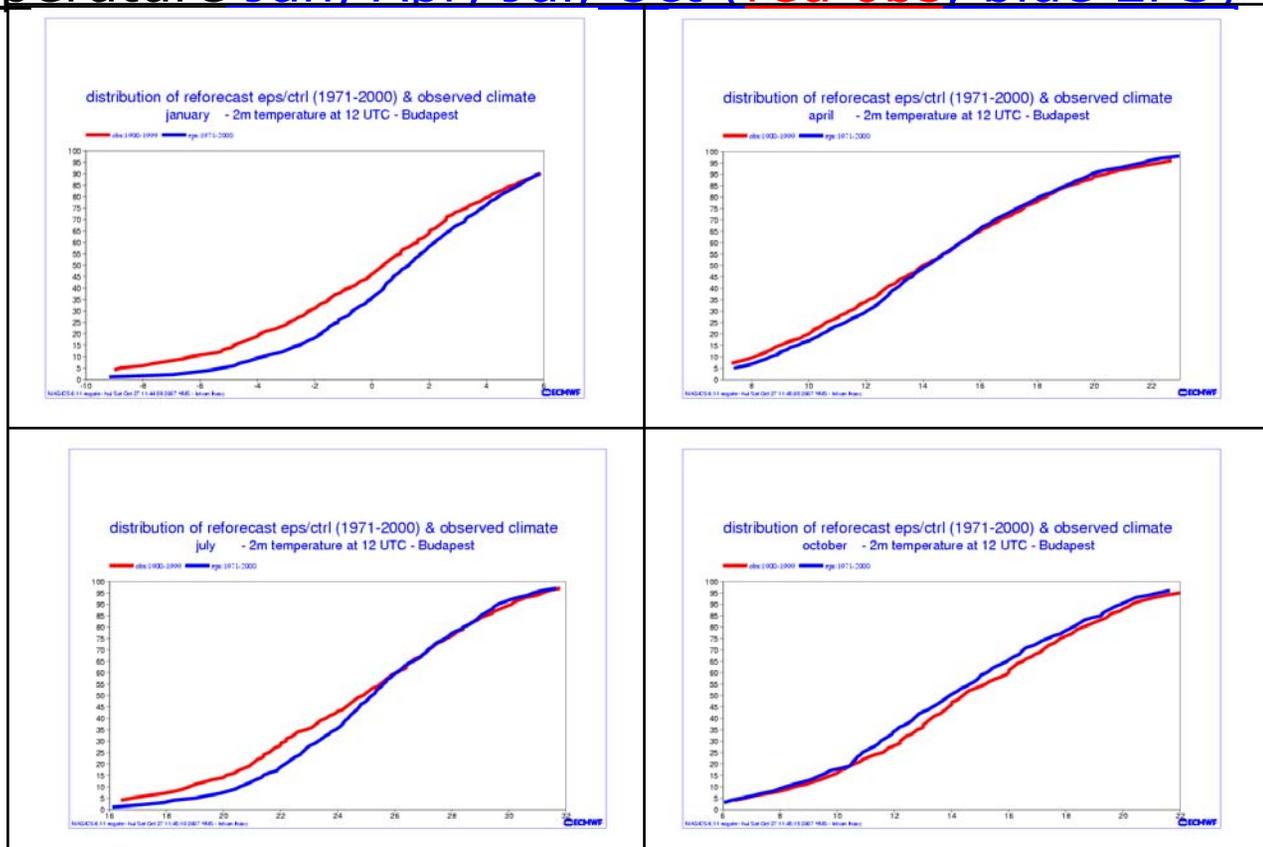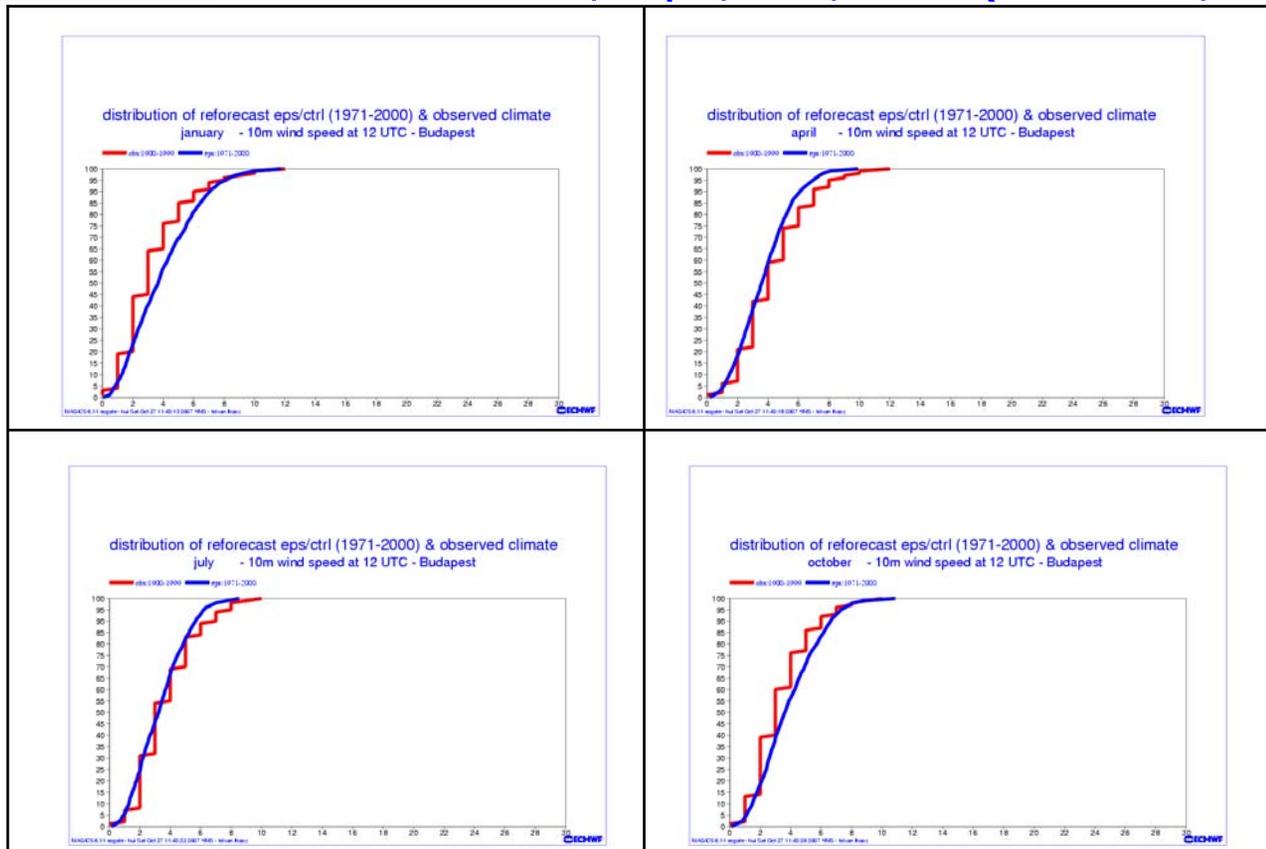
Calibration using reforecast Dataset (cont 3)

- Typical model and observation distributions : Budapest
 24h precipitation Jan, Apr, Jul, Oct (red obs, blue EPS)

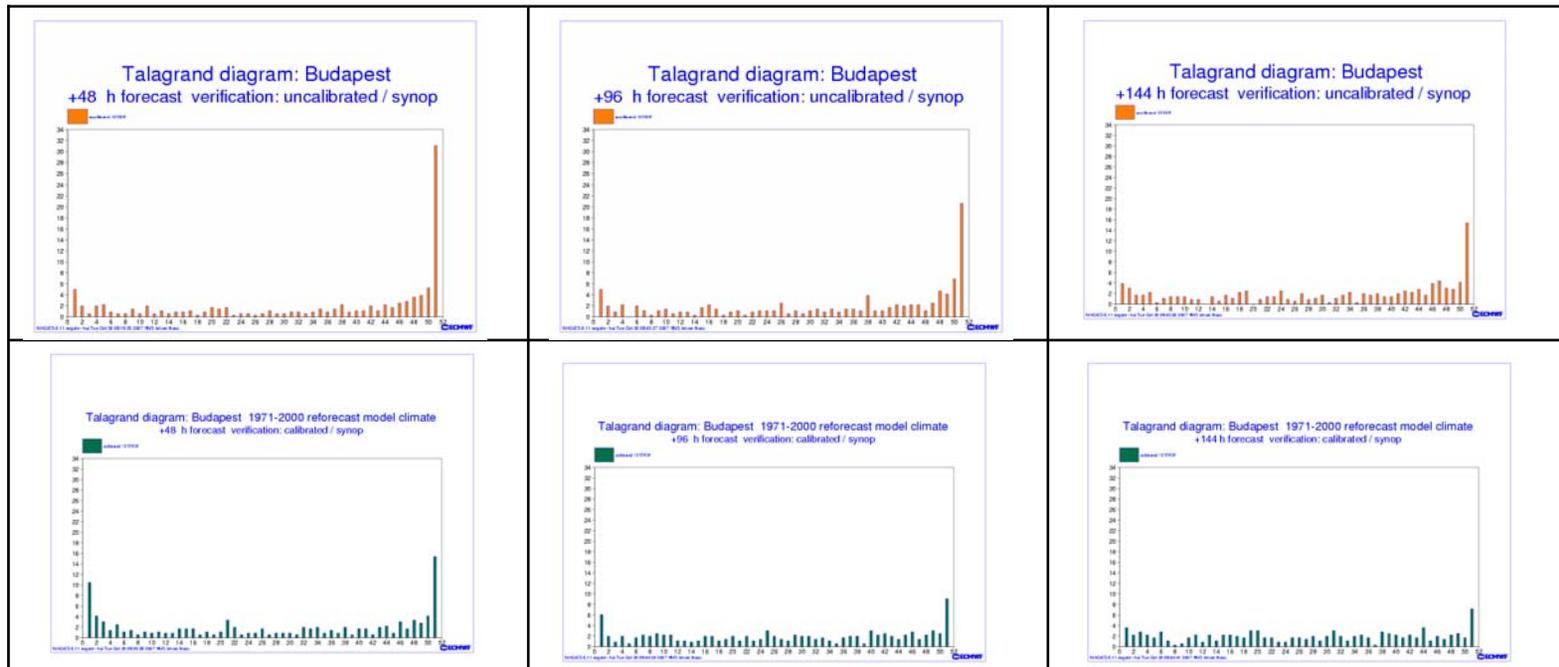# Calibration using reforecast Dataset (cont 4)

- Typical model and observation distributions: Budapest 10 m windseed at 12UTC Jan, Apr, Jul, Oct (red obs, blue EPS)

Calibration using reforecast Dataset (cont 5)

- Verification: Talagrand /48, +96, +144 h/, reliability diagram, ROC

Future plans:

Calibration for week one (D2 – D8), two (D 9 – D 15)

and monthly forecast planned to be developed H1 2008, operational H2 2008

HAWK-3

Thanks to Mark Rajnai

Current operative tool: *HAWK-2*
since 2000
continuous development until 2006

New tool: *HAWK-3*
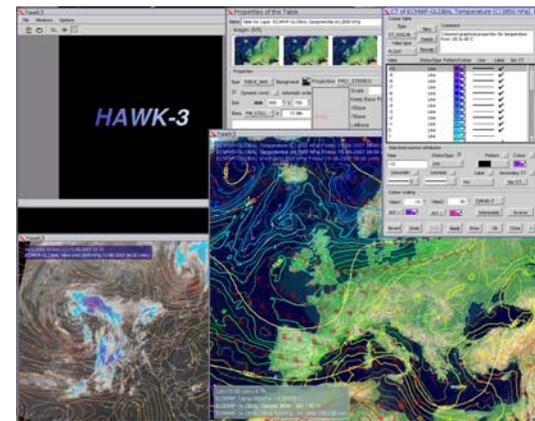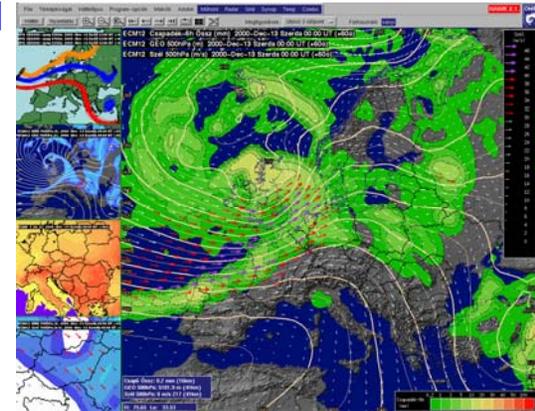Complex visualization tool for duty forecasters and researchers

Development started: end of 2004
Testing period: from Now on
Operative: 2009 (expected)
Platform: Linux (Windows)
Language: C++ (with Qt, NetCDF,
　　　　　ECMWF GRIB API)

HAWK-3 (cont)

Current state (Nov 2007):

- radar, satellite, synop, grid data (analysis, deterministic & ensemble forecasts)
- controllable settings (colour, time, scan, ...)
- efficient graphical user interface
- product generation mode
- various map projections
- multi window system
- macros
- language support
- users (with own settings)
- animation, zoom, image saving
- basic operations on grid data, interpolation, gradient, composite creation
  for radar (multiple stations) and satellite (multiple channels) image
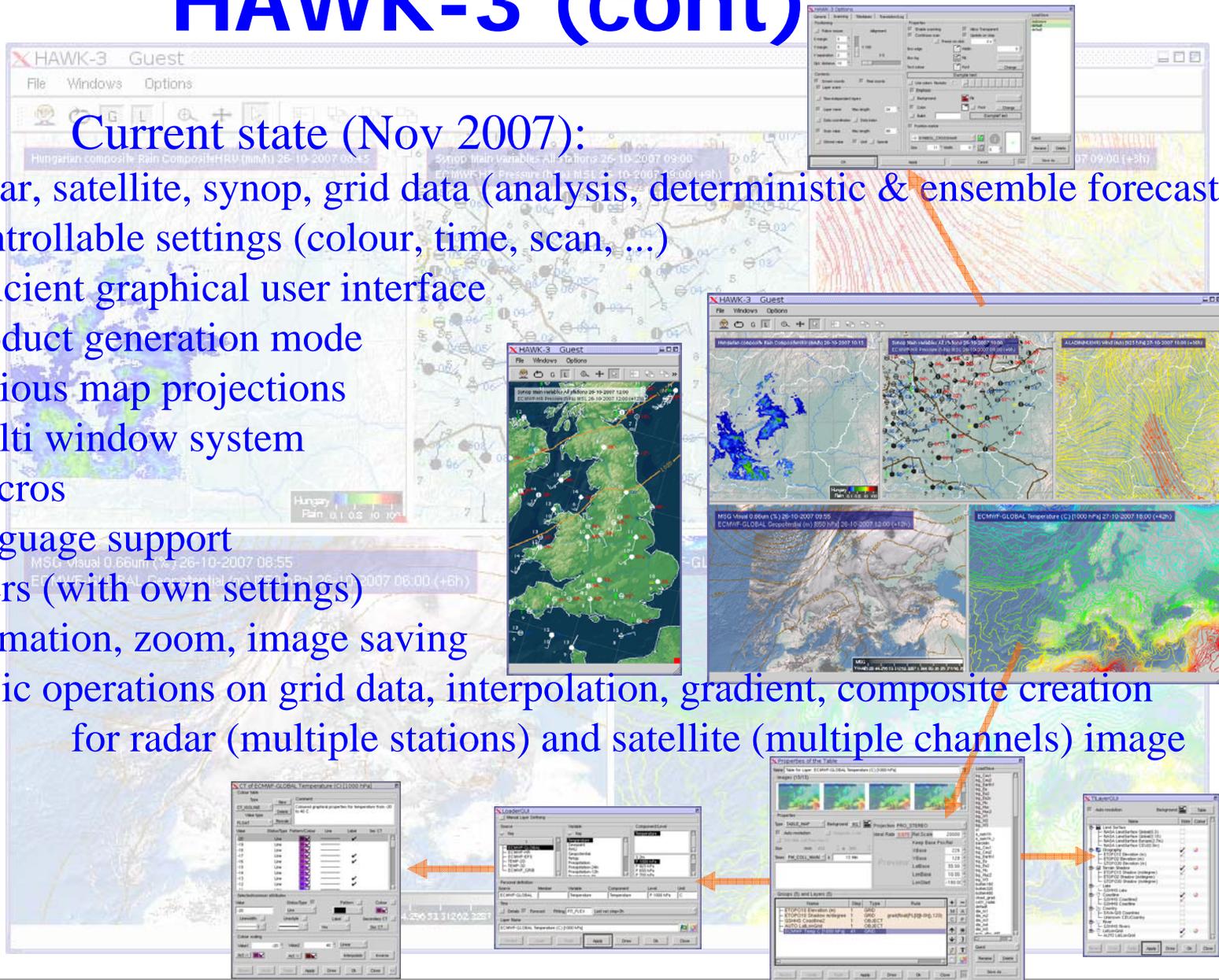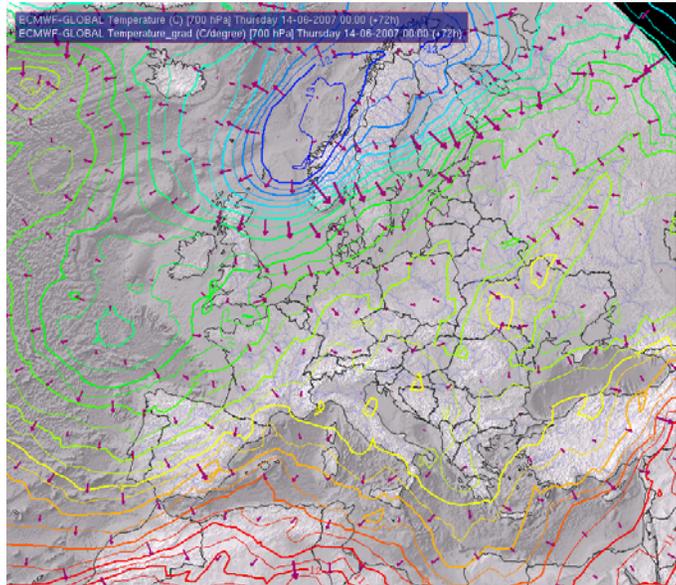
HAWK-3 (cont 2)

Streamlines with emphasised
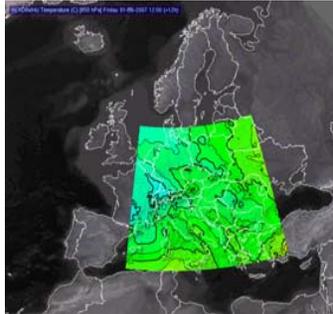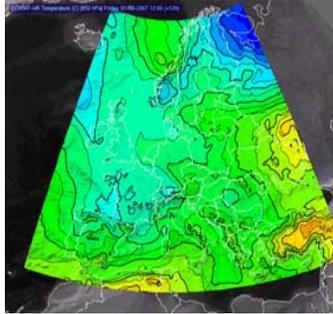windy areas
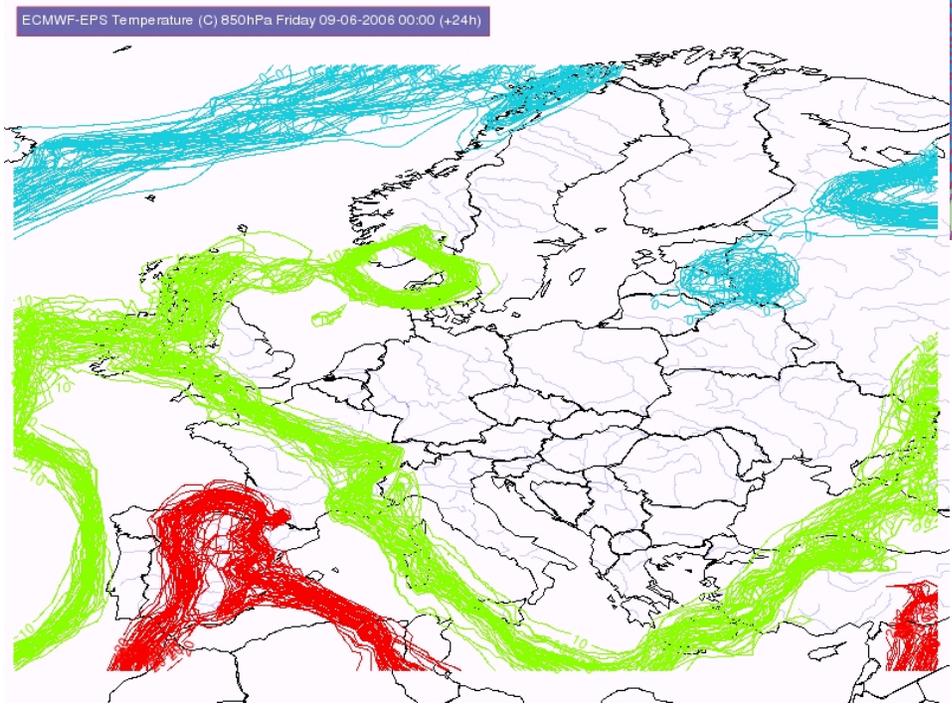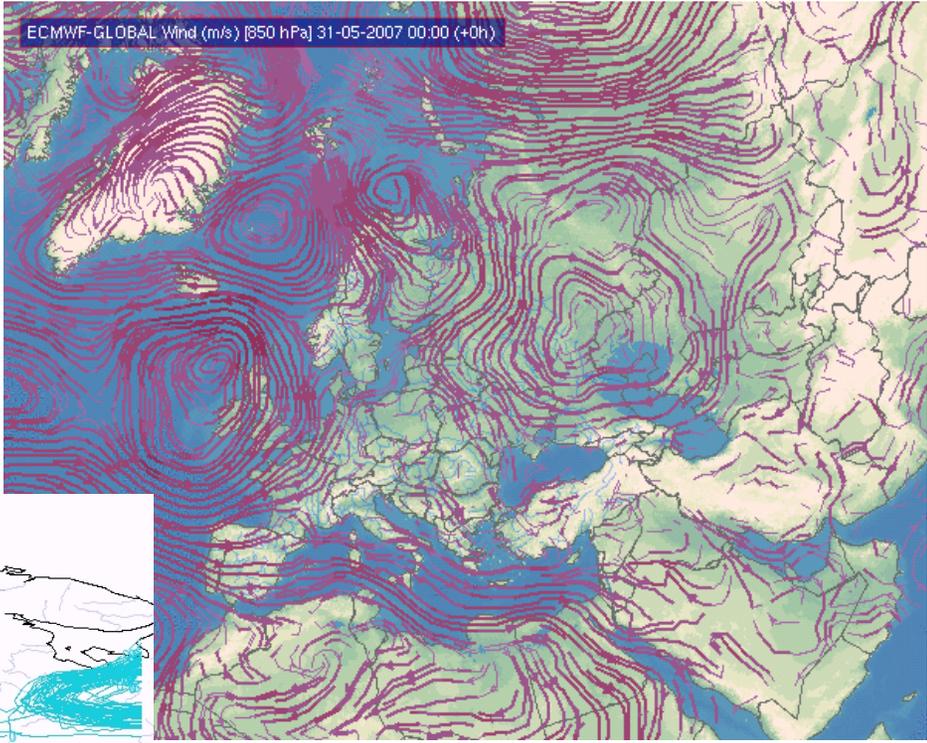
HAWK-3 (cont 3)

Gradient calculation:

temperature gradient

Interpolation:

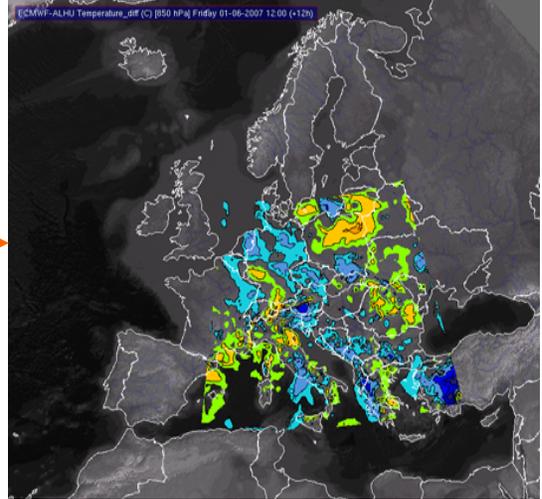difference of
two fields

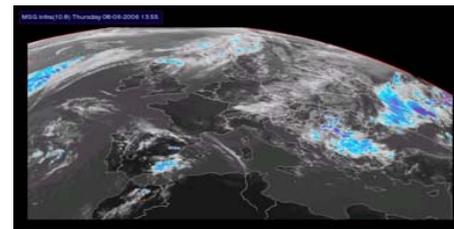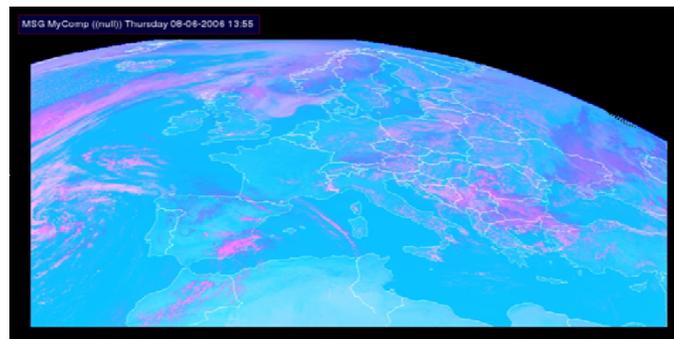T(ALHU) -
T(ECMWF)
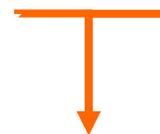
HAWK-3 (cont 4)

Composite satellite image
from different channels
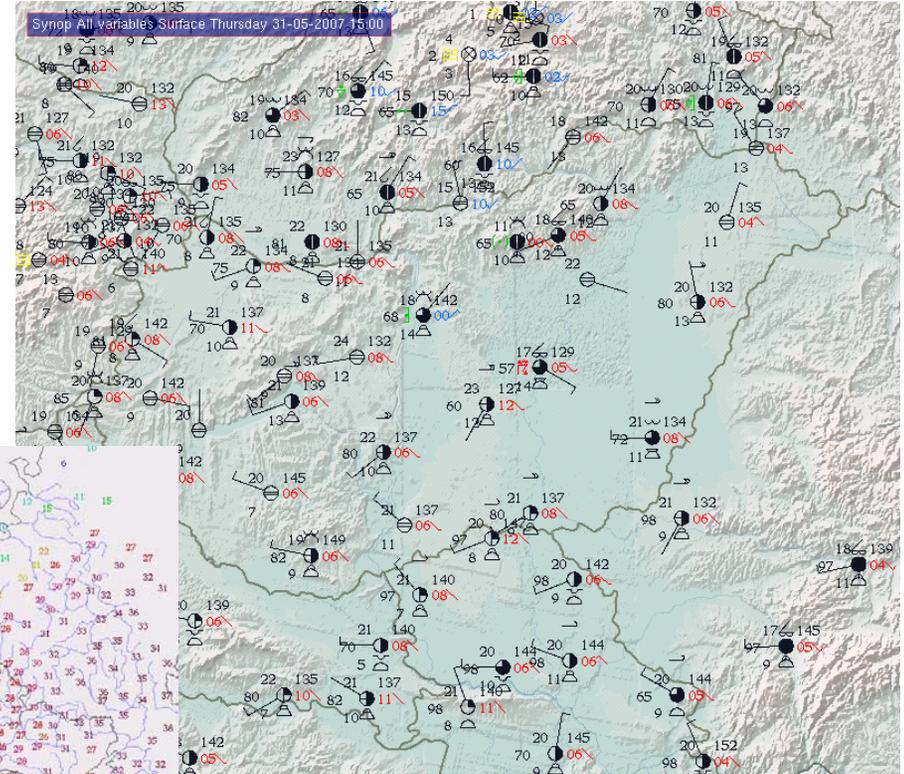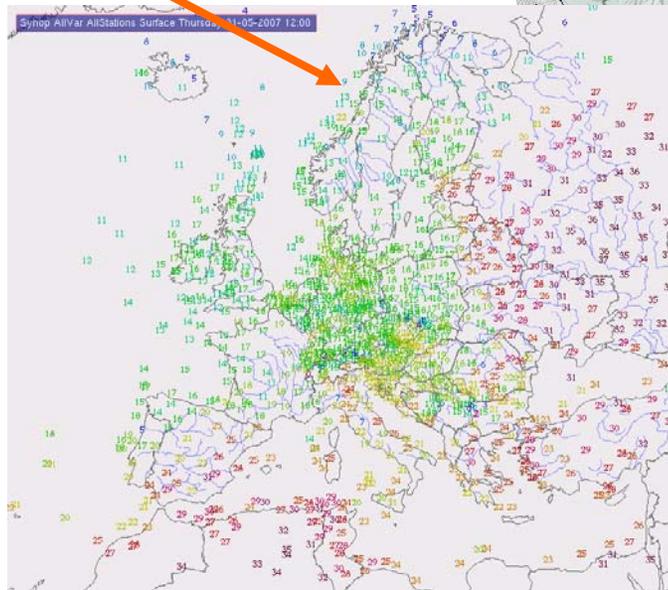
Radar composition

from two radar sources
(interpolation)

HAWK-3 (cont 5)

Observations (SYNOP)
- Colour settings
- Filters

>20°C

HAWK-3 (cont 6)

Plans:
- other datatypes (TEMP, AMDAR, windprofiler, lightning, MSG-SAF products, trajectory, frontlines, pictures)
- other visualization modes (vertical profile, cross section, meteogram)
- addition input data formats (eg. FA, HDF, BUFR)
- printing
- grid & frontline editing
- ergonomic development & optimalization
- commercialization

ECMWF-GLOBAL Temperature (C) [850 hPa] 27-10-2007 00:00 (+0h)