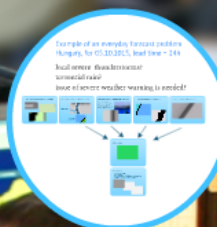


# Thunderstorm forecast chain based on different types of NWP products

Kornél Kolláth

Hungarian Meteorological Service



# Thunderstorm forecast chain based on different types of NWP products

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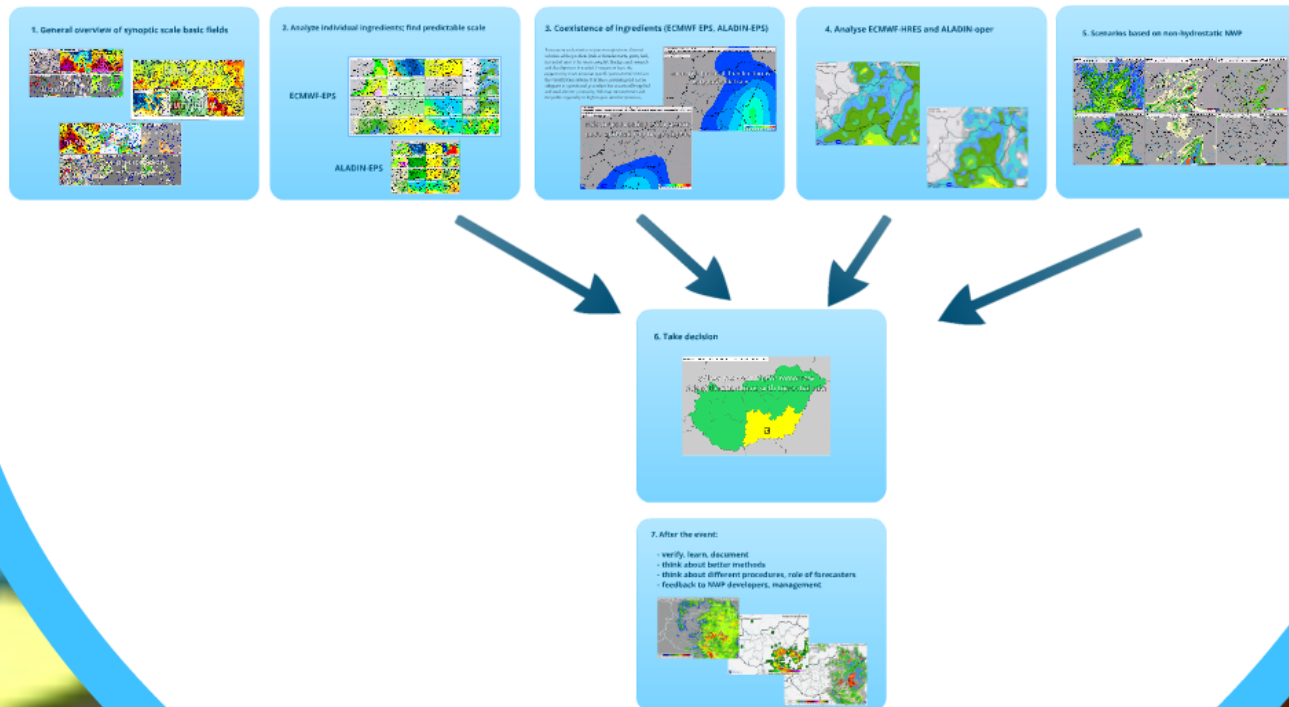


Example of an everyday forecast problem  
Hungary, for 05.10.2015, lead time ~ 24h

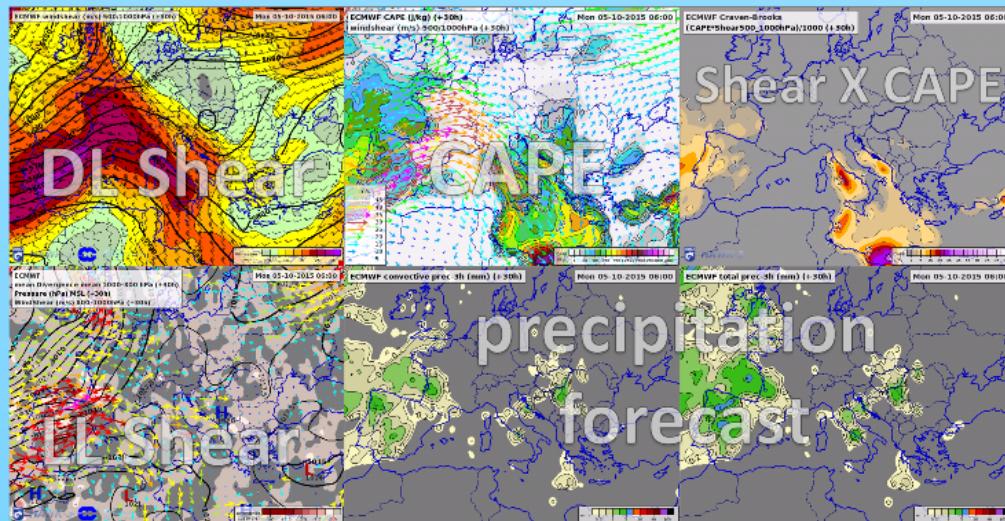
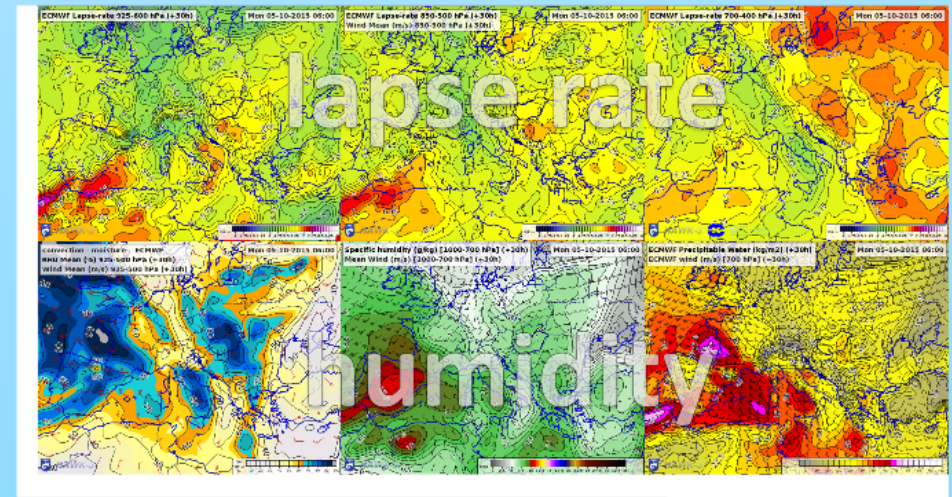
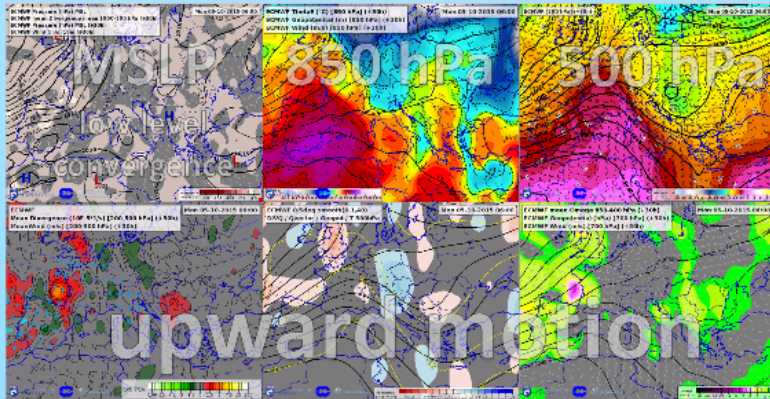
local severe thunderstorms?

torrential rain?

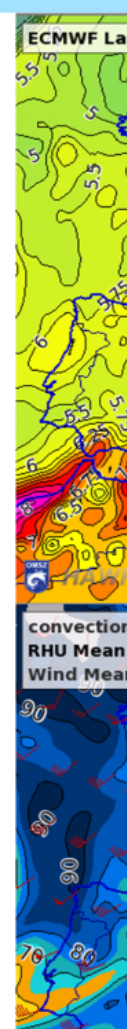
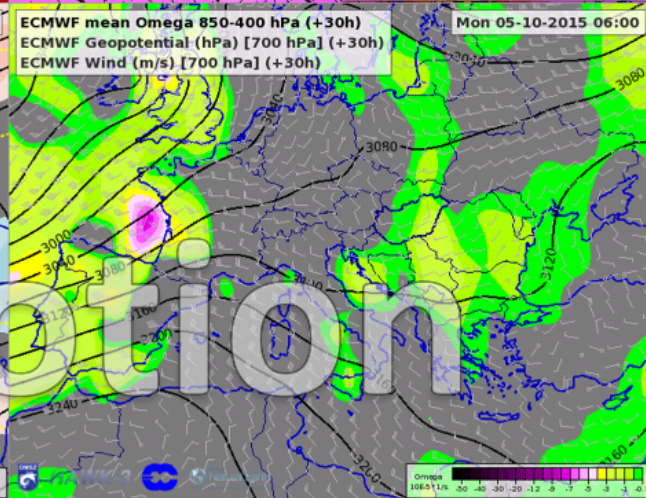
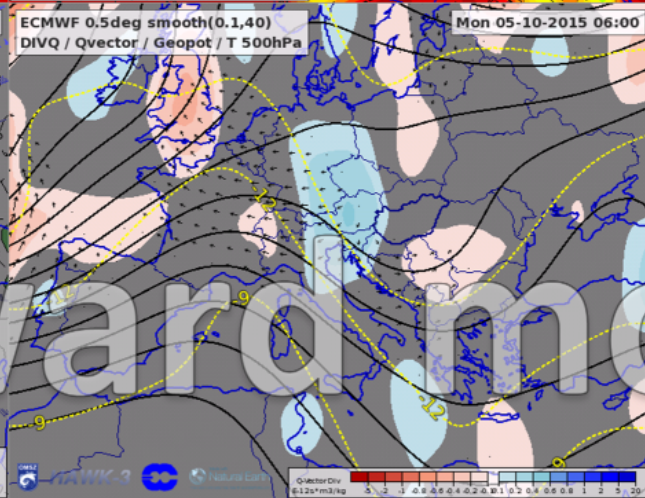
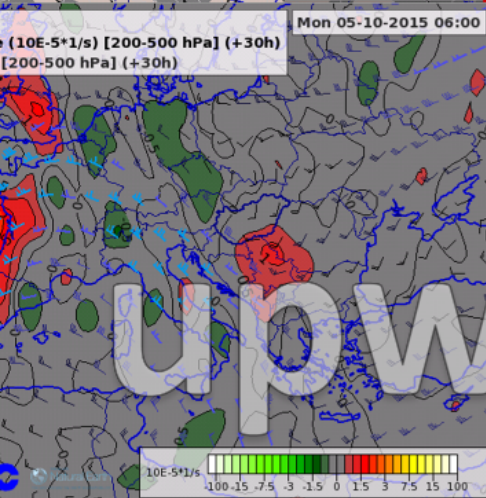
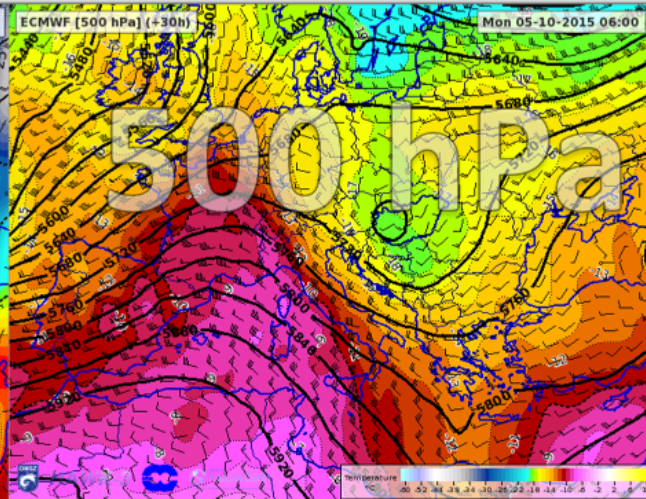
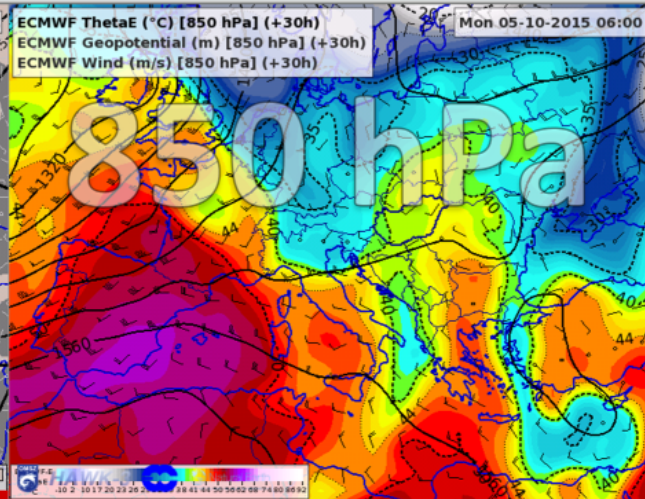
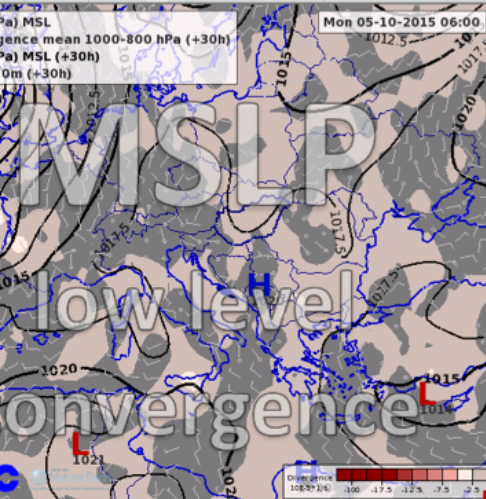
issue of severe weather warning is needed?



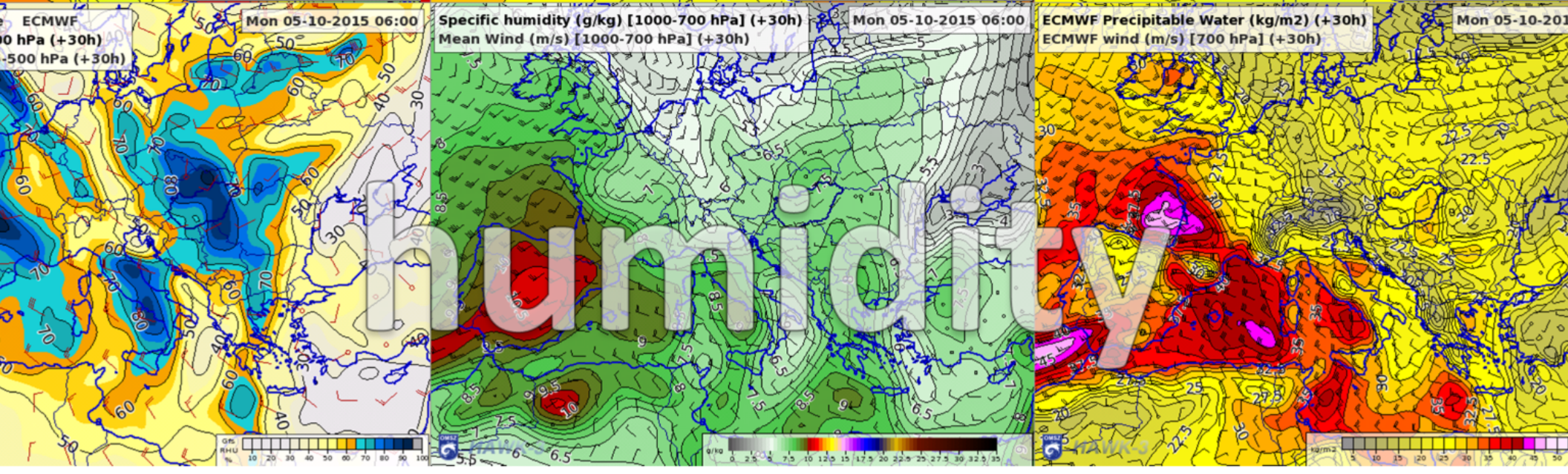
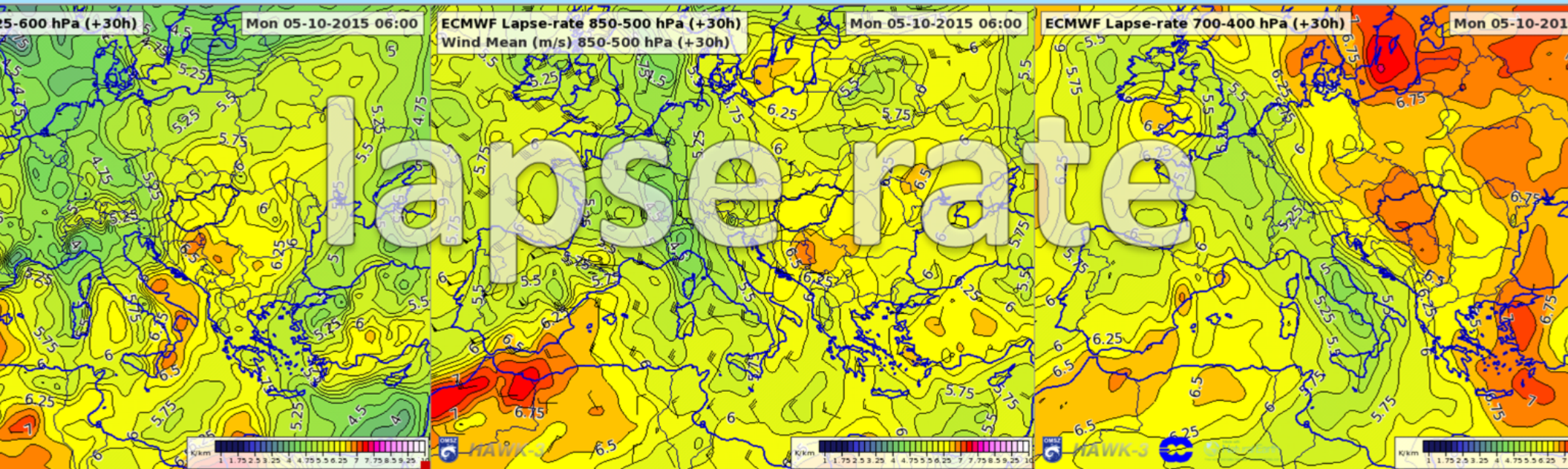
# 1. General overview of synoptic scale basic fields



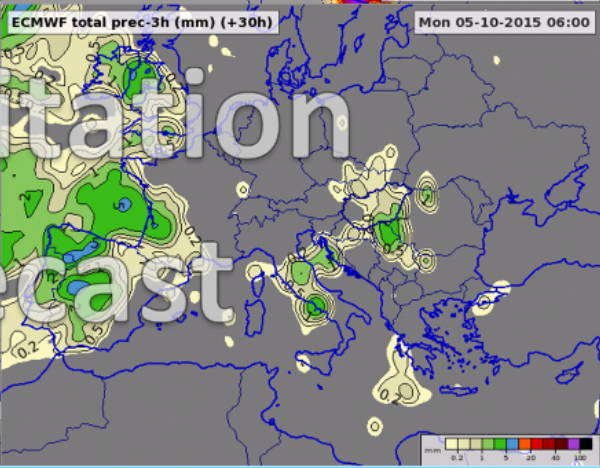
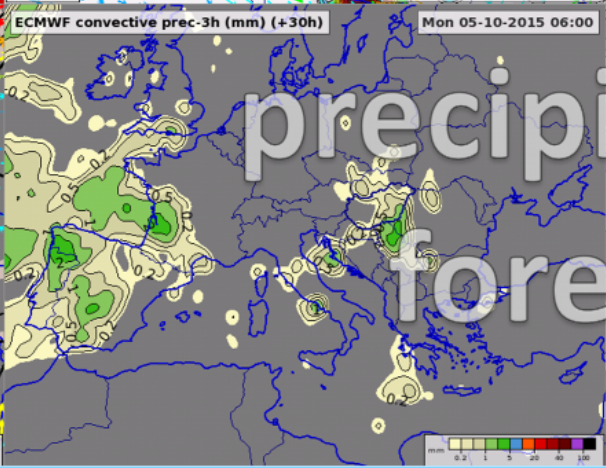
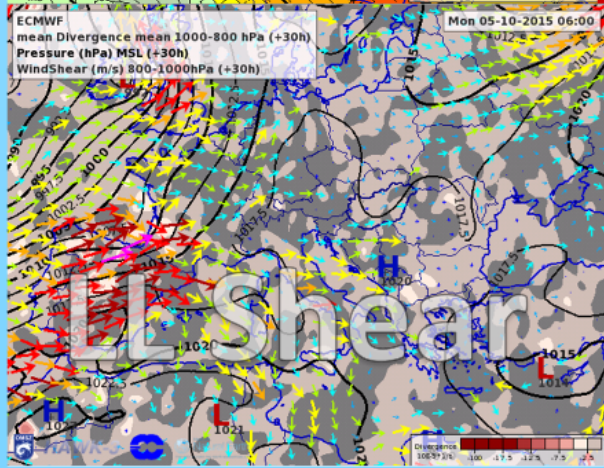
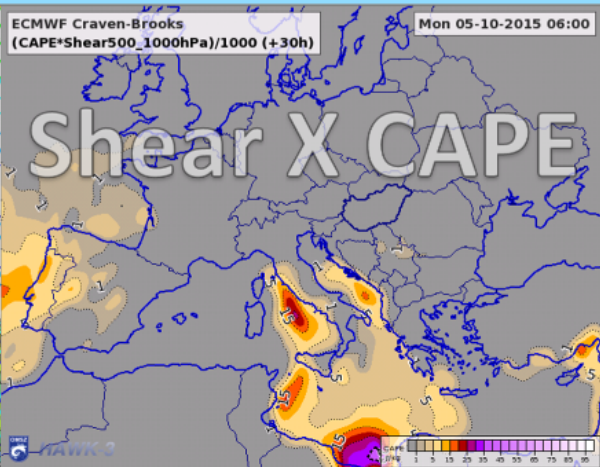
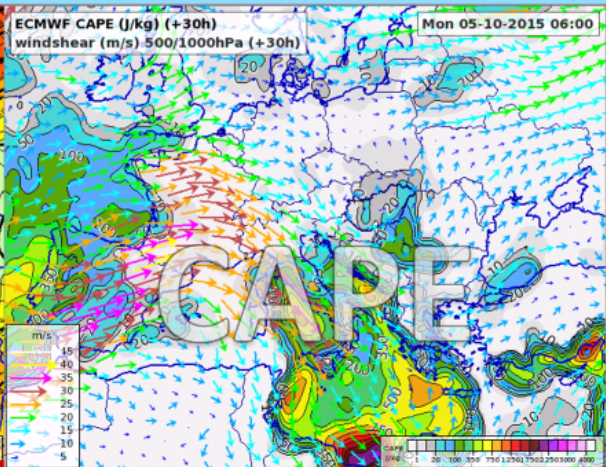
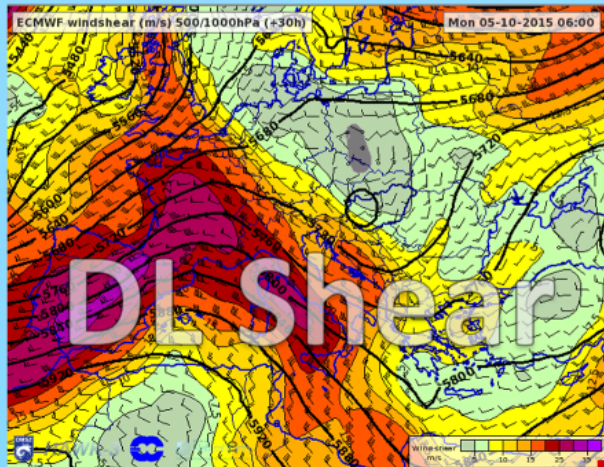
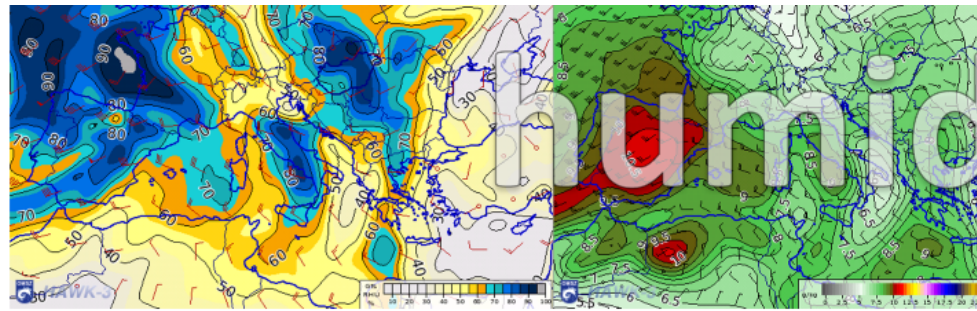








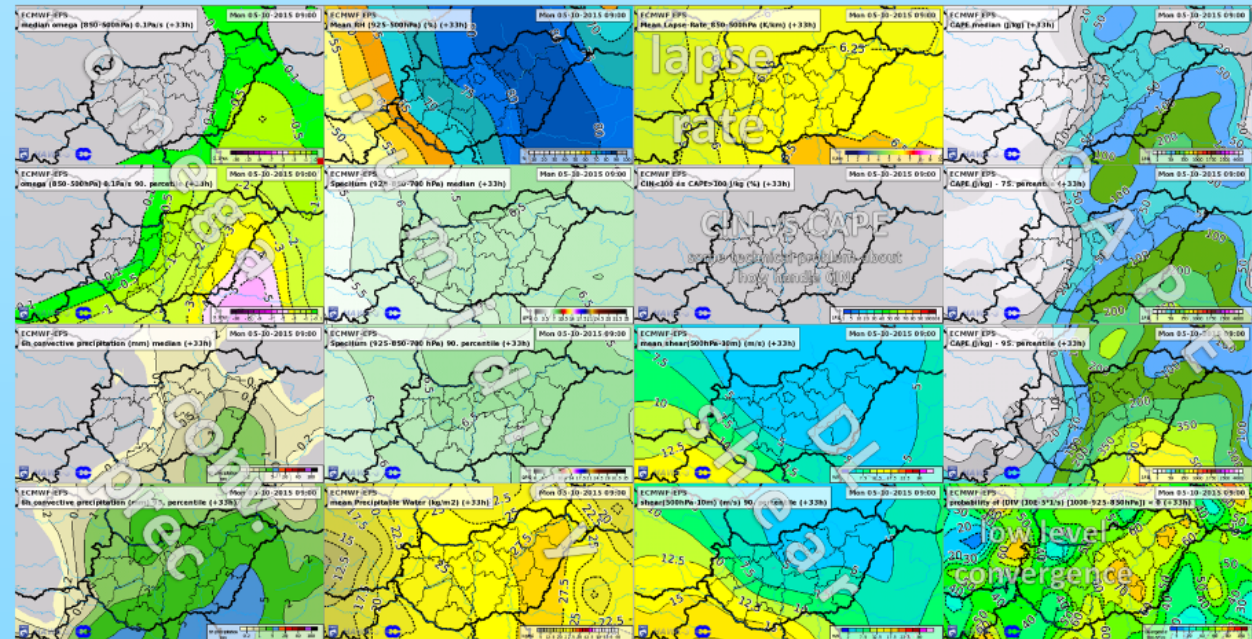




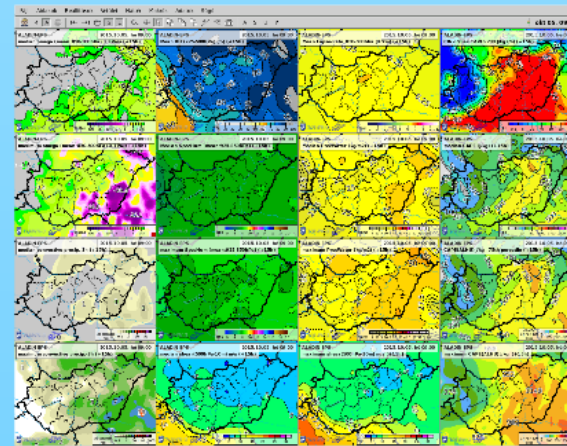


## 2. Analyze individual ingredients; find predictable scale

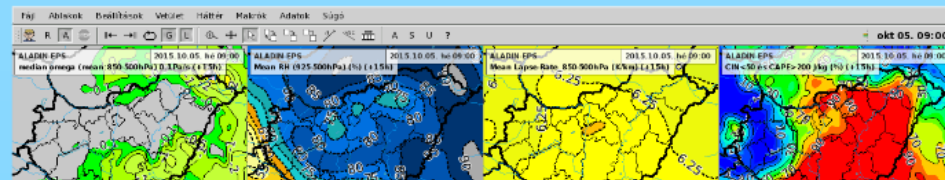
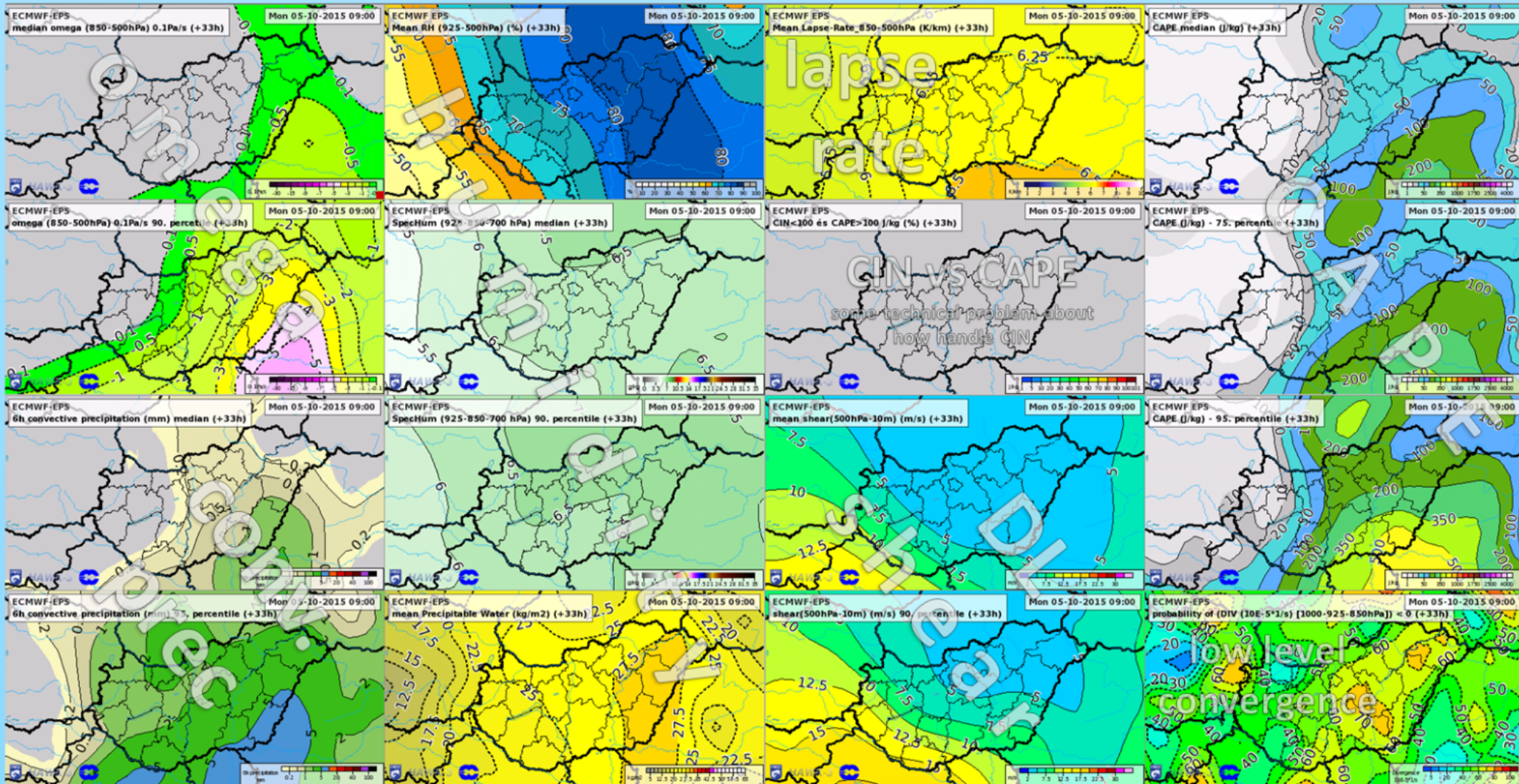
ECMWF-EPS



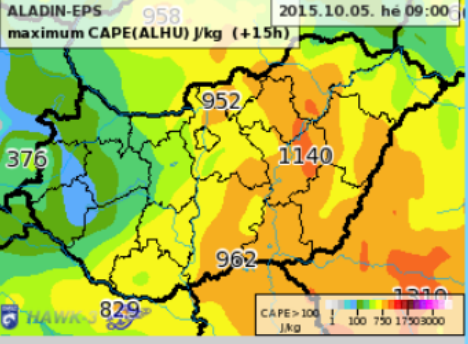
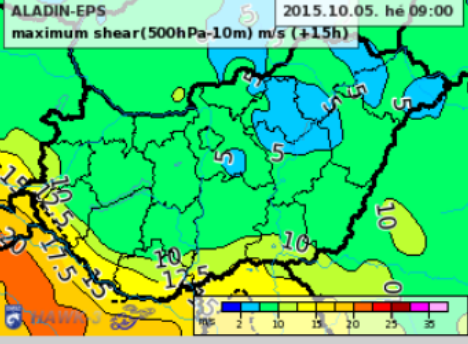
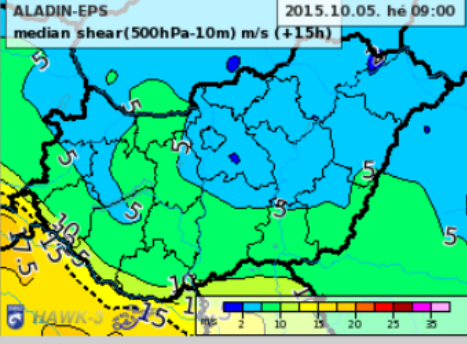
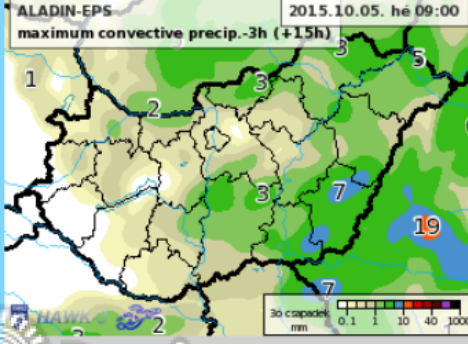
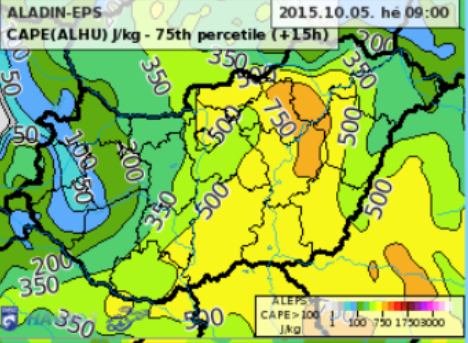
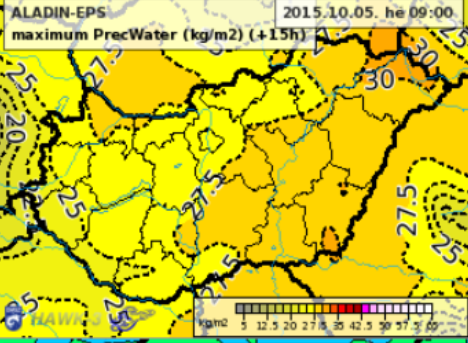
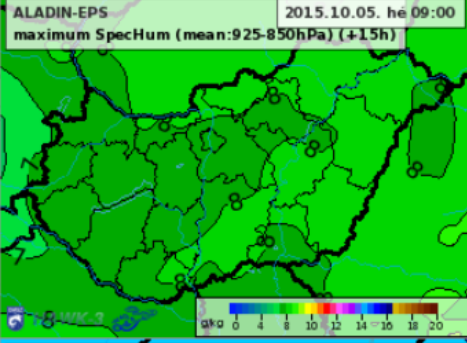
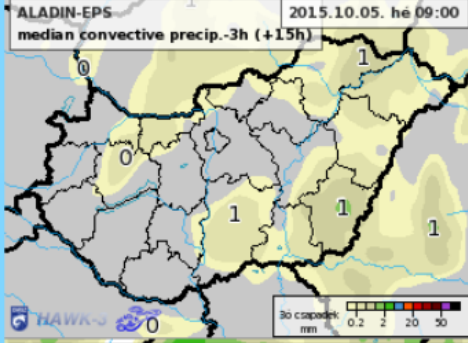
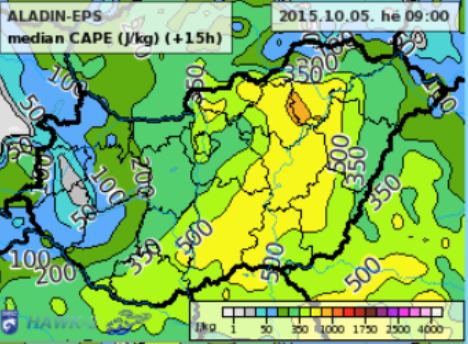
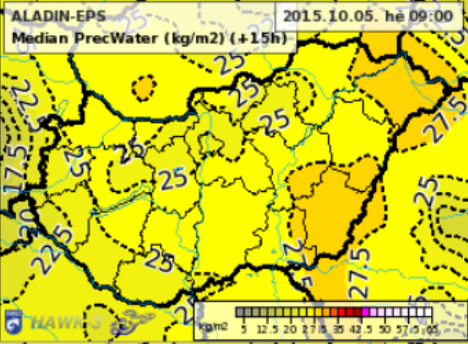
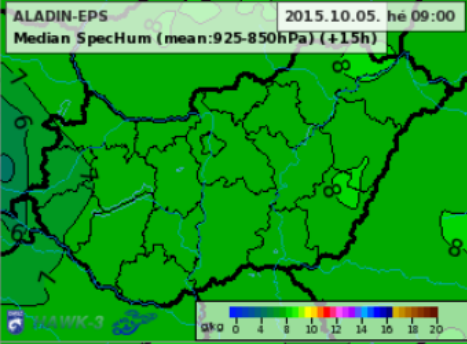
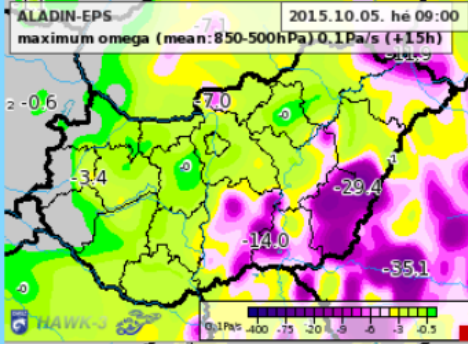
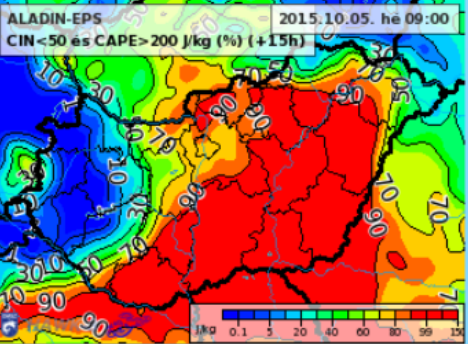
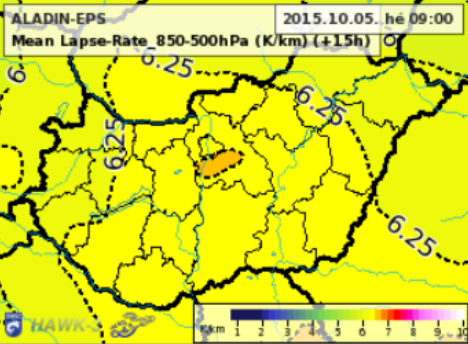
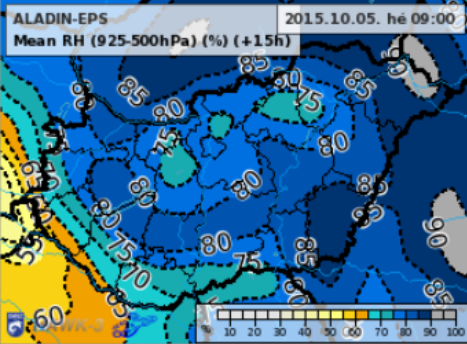
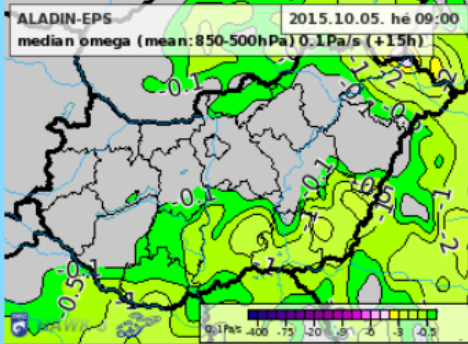
ALADIN-EPS







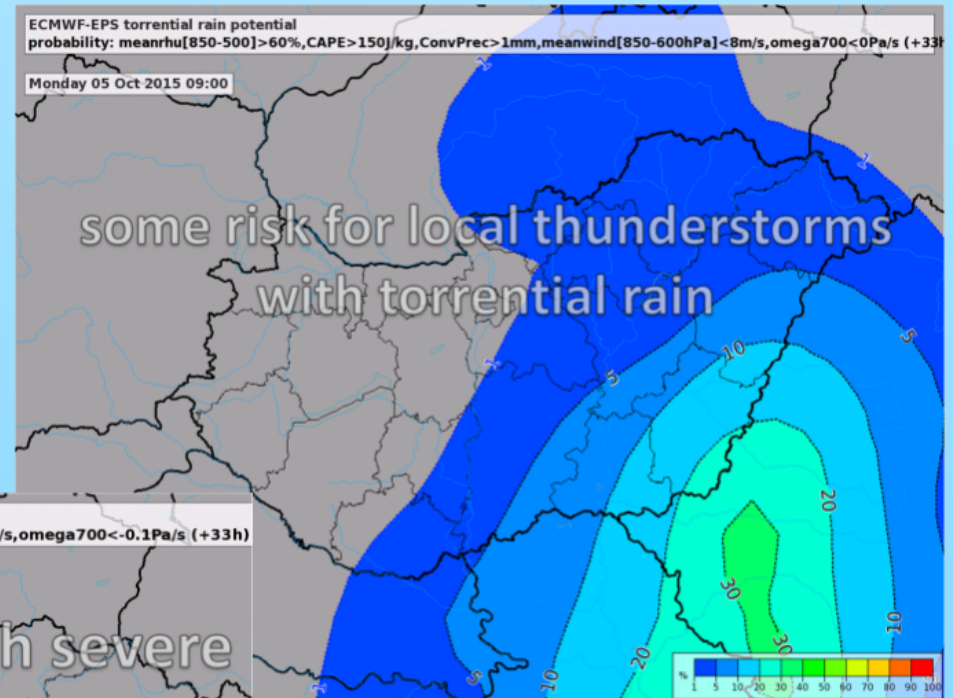




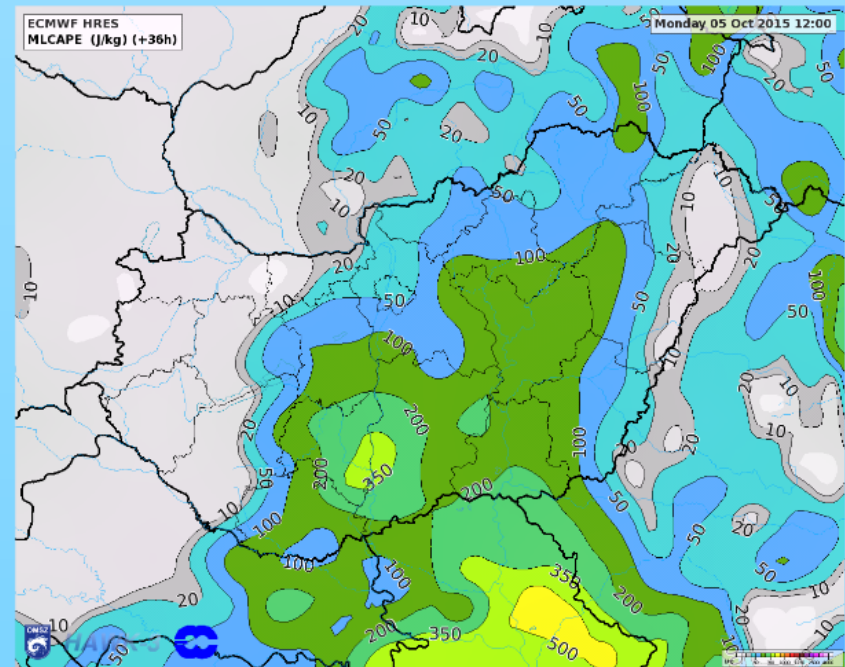
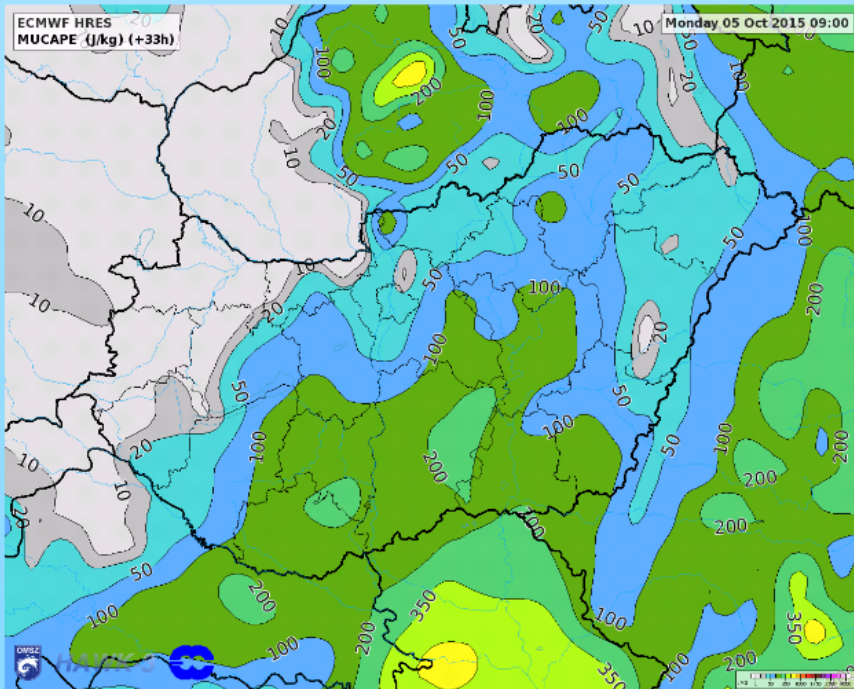


### 3. Coexistence of ingredients (ECMWF EPS, ALADIN-EPS)

Parameters and criteria are just examples here. General solution of the problem (risk of thunderstorm, gusts, hail, torrential rain) is far more complex. Background research and development is needed. Forecasters have the opportunity to set situation specific parameters/criteria in the visualization system. It is time consuming and not so adequate as operational procedure but occasionally applied and used also for generating risk map for customers and the public especially in high impact weather situation.

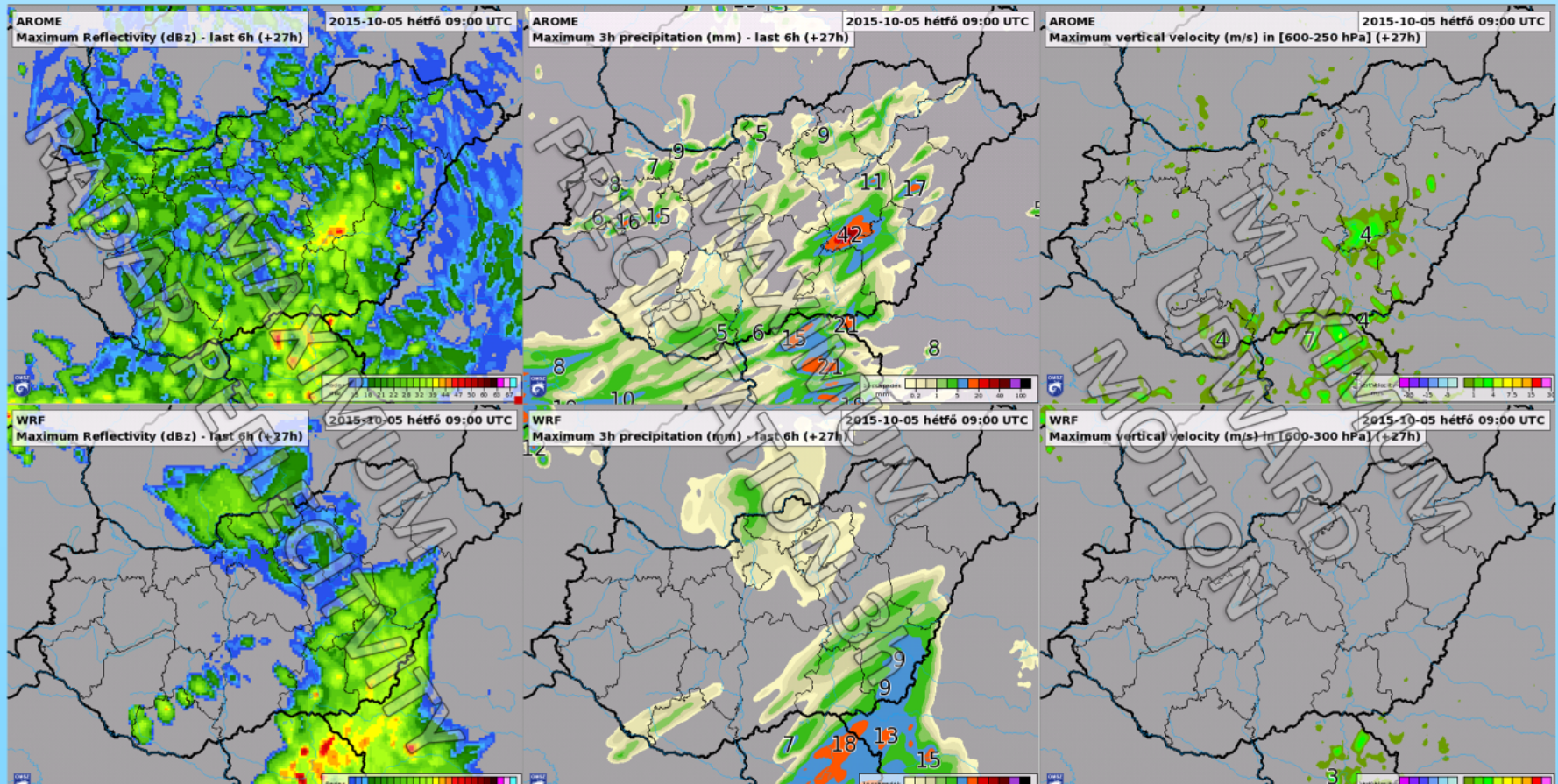


# 4. Analyse ECMWF-HRES and ALADIN-oper





# 5. Scenarios based on non-hydrostatic NWP



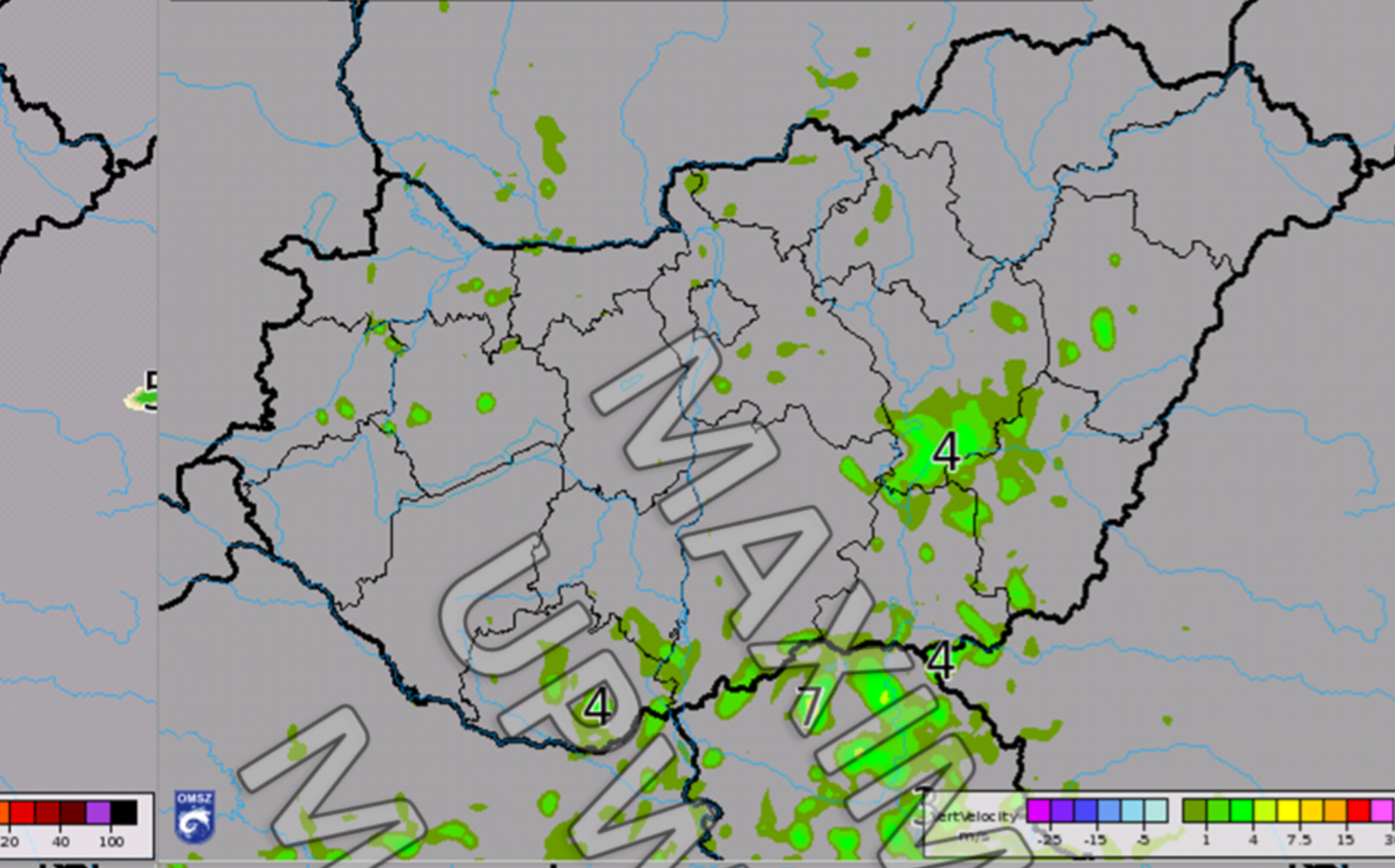


09:00 UTC

AROME

2015-10-05 hétfő 09:00 UTC

Maximum vertical velocity (m/s) in [600-250 hPa] (+27h)



09:00 UTC

WRF

2015-10-05 hétfő 09:00 UTC

Maximum vertical velocity (m/s) in [600-300 hPa] (+27h)

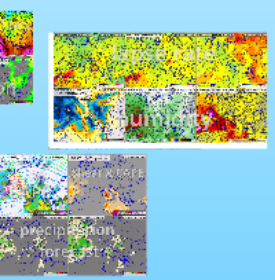


# local severe thunderstorms?

# torrential rain?

# issue of severe weather warning is needed?

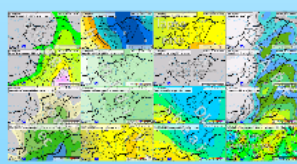
1. Overview of synoptic scale basic fields




precipitation forecast

2. Analyze individual ingredients; find predictable scale

ECMWF-EPS

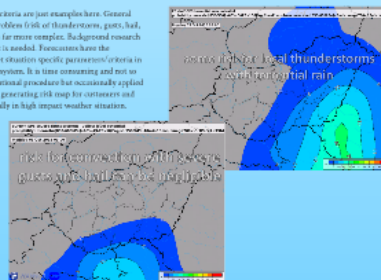


ALADIN-EPS

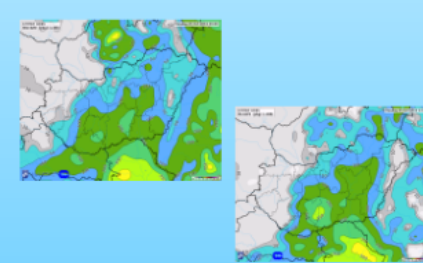


3. Coexistence of ingredients (ECMWF EPS, ALADIN-EPS)

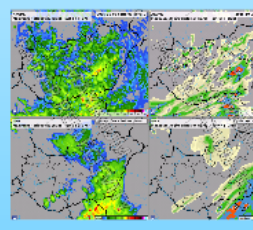
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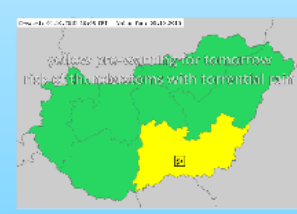
4. Analyse ECMWF-HRES and ALADIN-oper



5. Scenarios based on non-hydro



6. Take decision

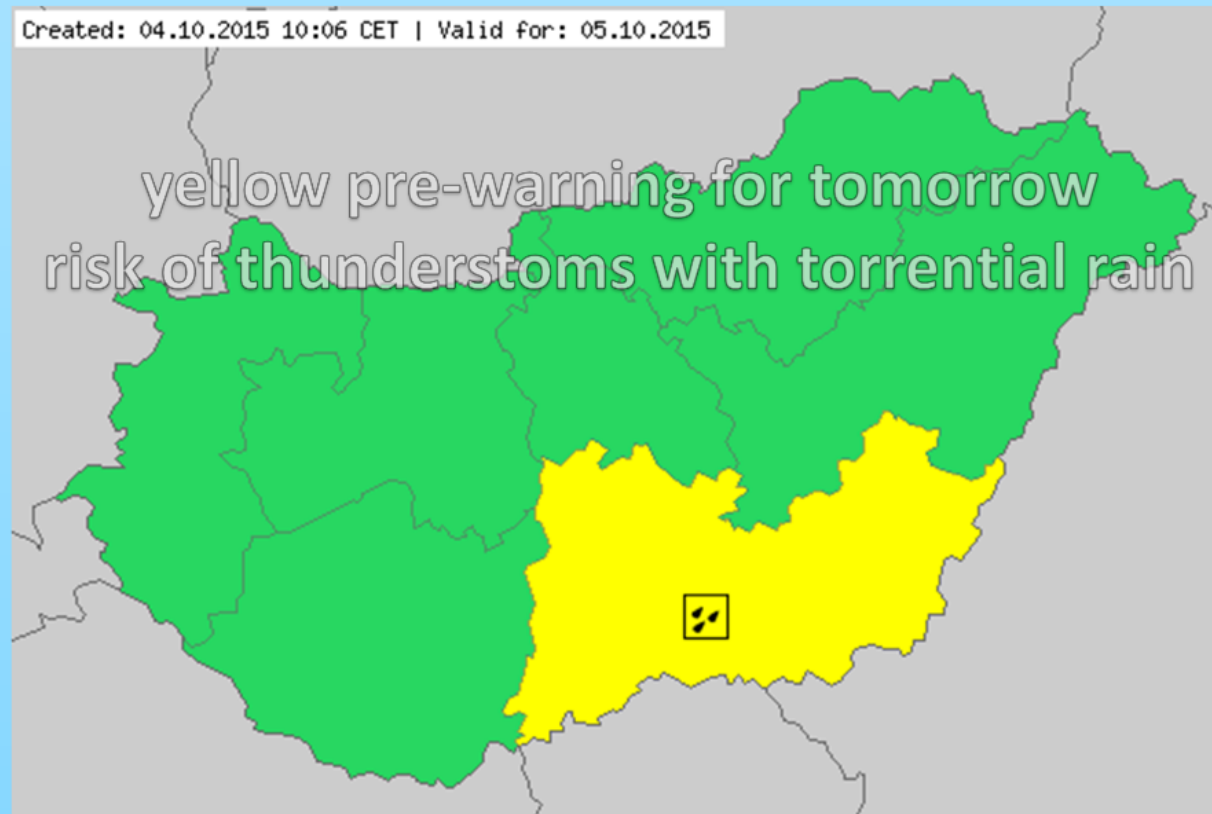


7. After the event:

- verify, learn, document
- think about better methods
- think about different procedures, role of forecasters
- feedback to NWP developers, management

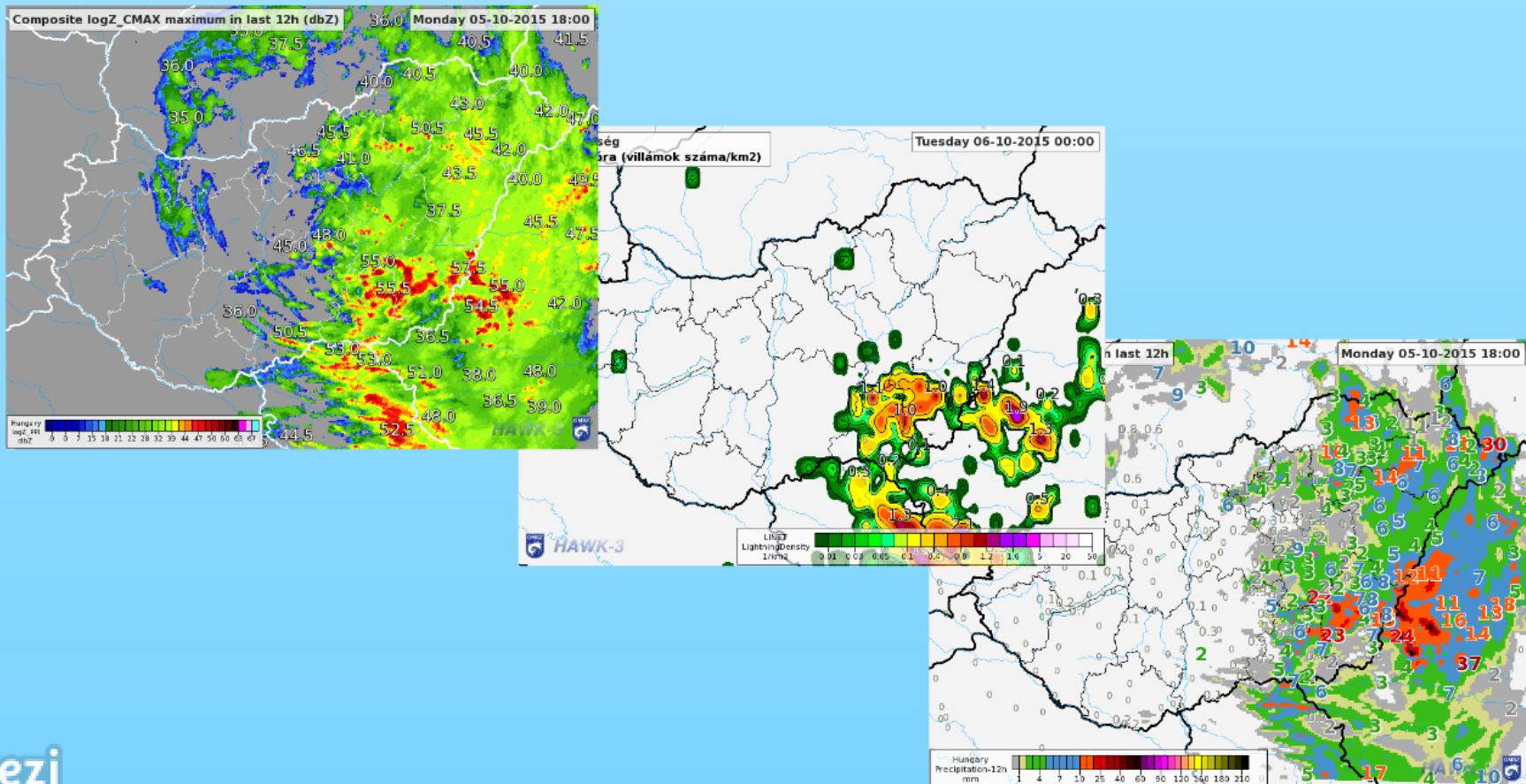


## 6. Take decision



## 7. After the event:

- verify, learn, document
- think about better methods
- think about different procedures, role of forecasters
- feedback to NWP developers, management





# Example of an everyday forecast problem Hungary, for 05.10.2015, lead time ~ 24h

local severe thunderstorms?

torrential rain?

issue of severe weather warning is needed?

