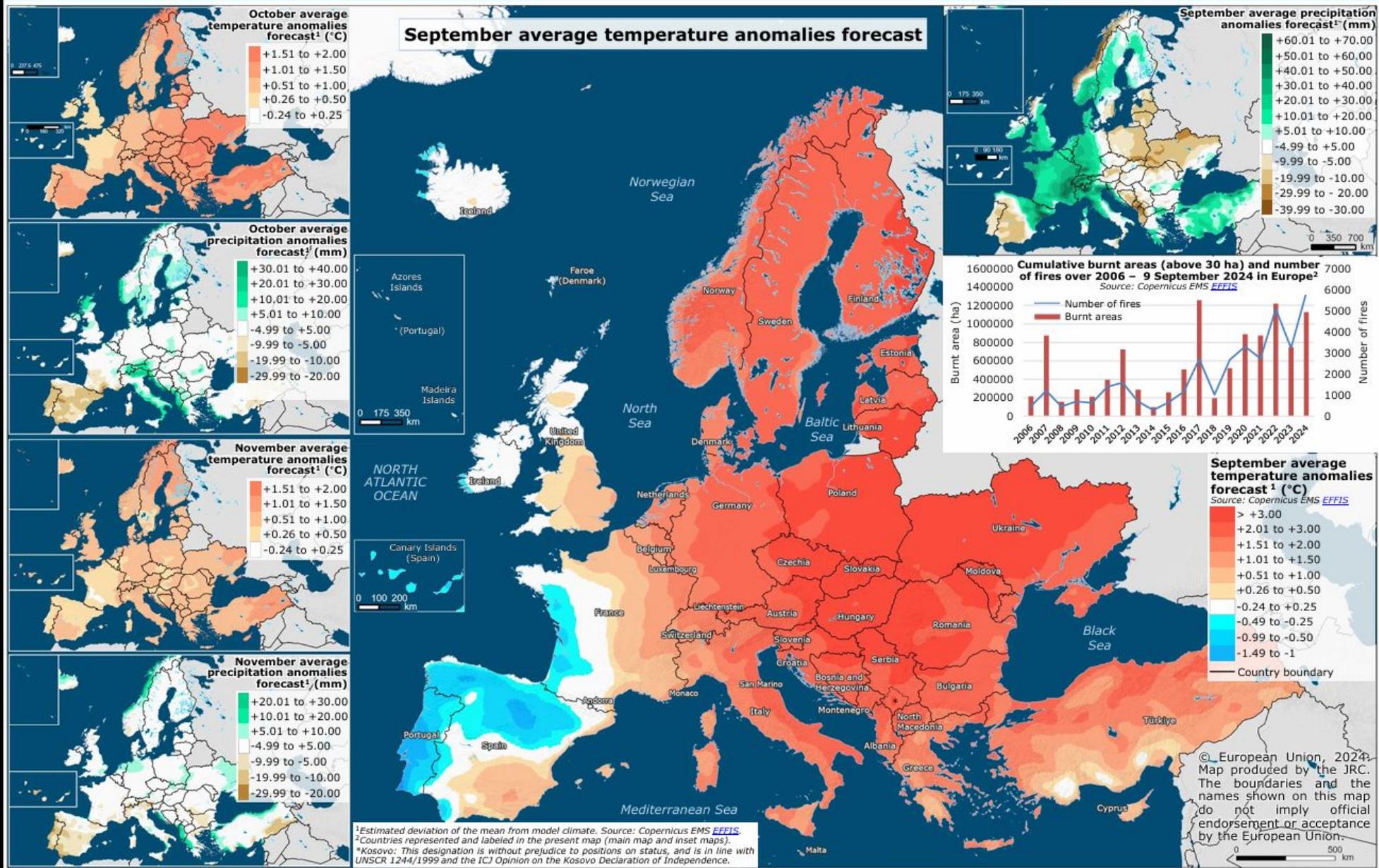
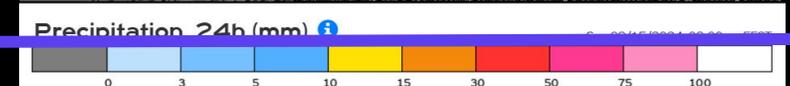
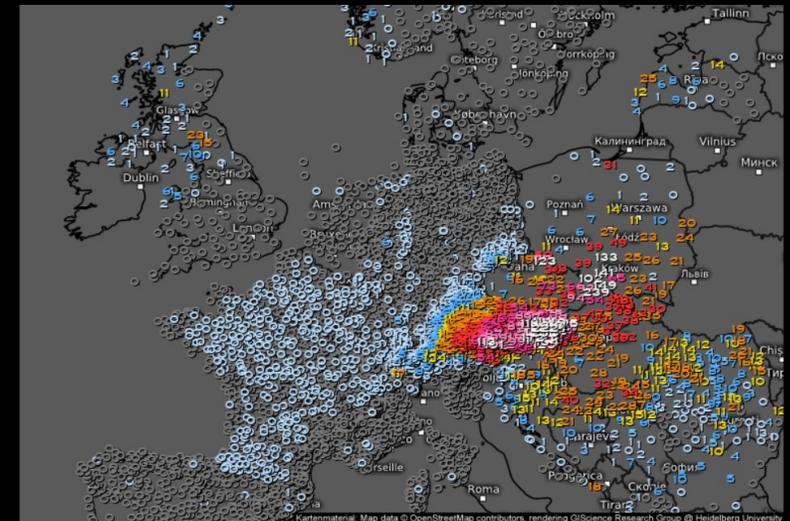
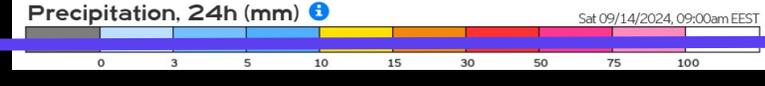
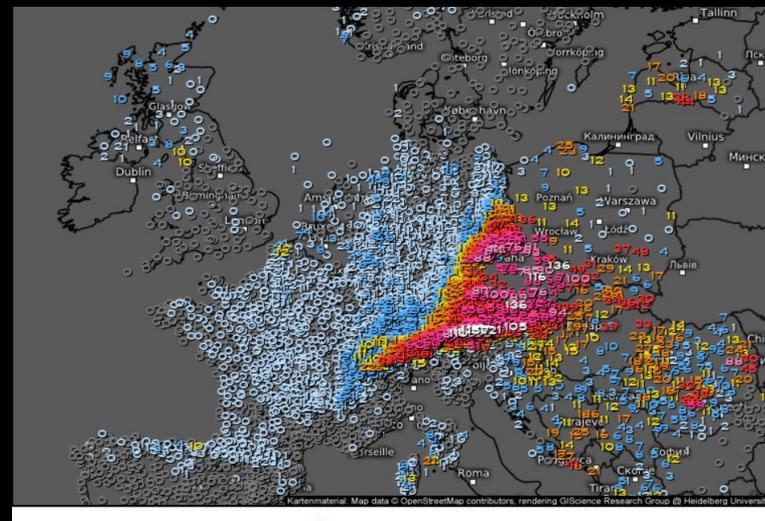
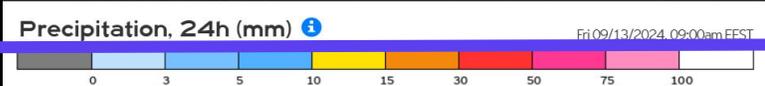
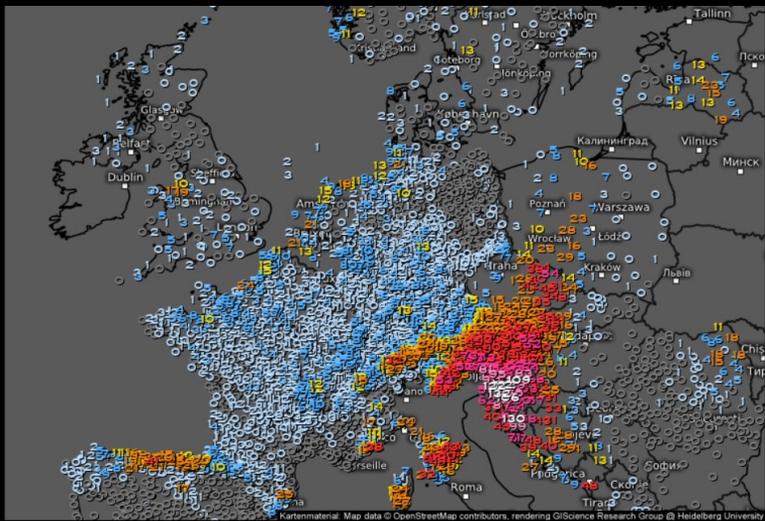


**Abundant precipitation in the eastern Romania in
September 2024**

Andrei - Adrian Domocoș, Carleta Elena Pasat

National Meteorological Administration of Romania





Flooded Franciscan monastery complex in Kłodzko, Poland, 15 September
© iStock/Markus - Own work



Rescue boat in Ostrava, Czech Republic
© iStock/Markus - Own work



Flooding in Ostrava, capital of the Moravian-Silesian Region in Czechia, September 2024. Credit: Fire and Rescue Service, Moravian-Silesian Region.



Flooding in Lower Silesian Voivodeship, Poland, September 2024. Credit: State Fire Service, Poland (Państwowa Straż Pożarna)



Iron Bridge in Kłodzko, flood
© iStock/Markus - Own work

POLITICĂ ACTUALITATE ECONOMIE EXTERNE SPORT TV MAGAZIN MAI MULTE

DIGI 24
RO

HOME > Știri > Actualitate > Evenimente > CJSU Galați a decis evacuarea oamenilor din zonele cu potențial de risc de inundații

VIDEO CJSU Galați a decis evacuarea oamenilor din zonele cu potențial de risc de inundații

Data actualizării: 29.09.2024 14:07
 Data publicării: 29.09.2024 14:06

SUA Galați a disoccat în teren utilaje, stopate pe podurile cu risc, pentru a se putea interveni cât mai rapid posibil. Imagine cu caracter ilustrativ. Sursa foto: Inquam Photos / George Călin

Toute persoanele din județul Galați care locuiesc pe albia râurilor și în zonele cu potențial de risc la inundații vor fi evacuate, potrivit deciziei luate duminică în cadrul Comitetului Județean pentru Situații de Urgență (CJSU).

Măsura a fost luată în contextul în care județul Galați se va afla, începând cu ora 20.00, sub avertizare hidrologică și meteorologică de Cod Portocaliu iar de la ora 00.00 și până luni, ora 9.00, sub avertizare Cod Roșu de ploai și inundații.

Summary

Climatologic description

Forecast models:

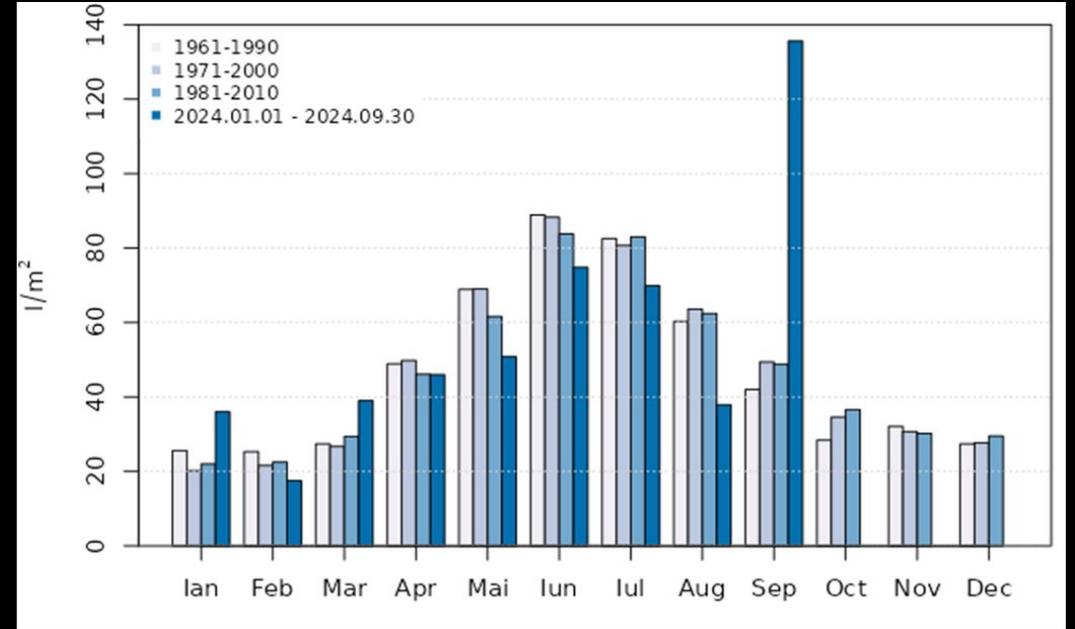
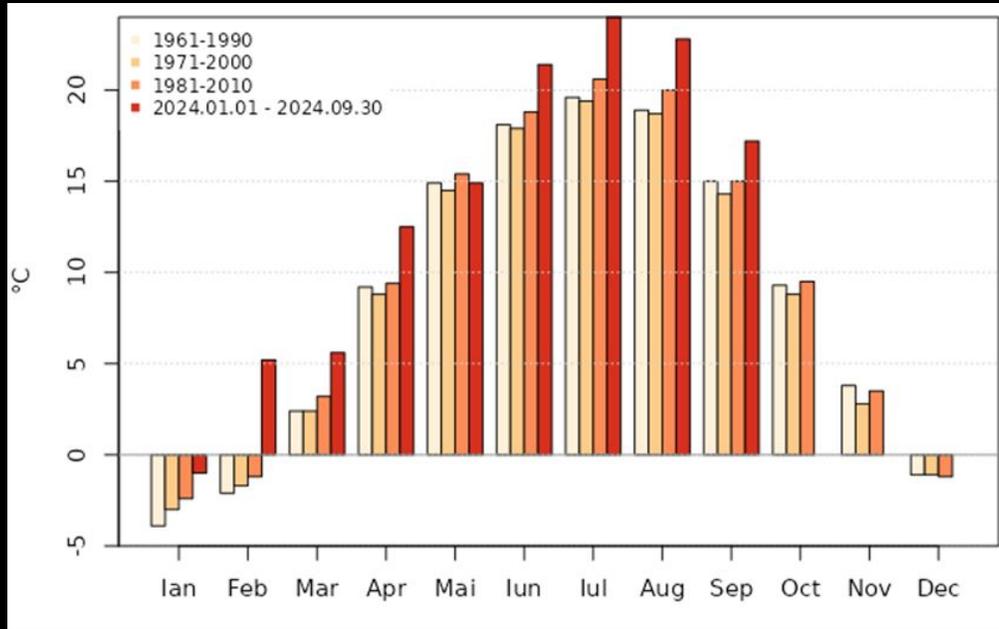
- instability fields, instability index, humidity/wind, estofex
- Precipitations
- ground level pressure maps and fronts

Satellite imagery

Radar Analysis

Conclusions

Climatology of September 2024

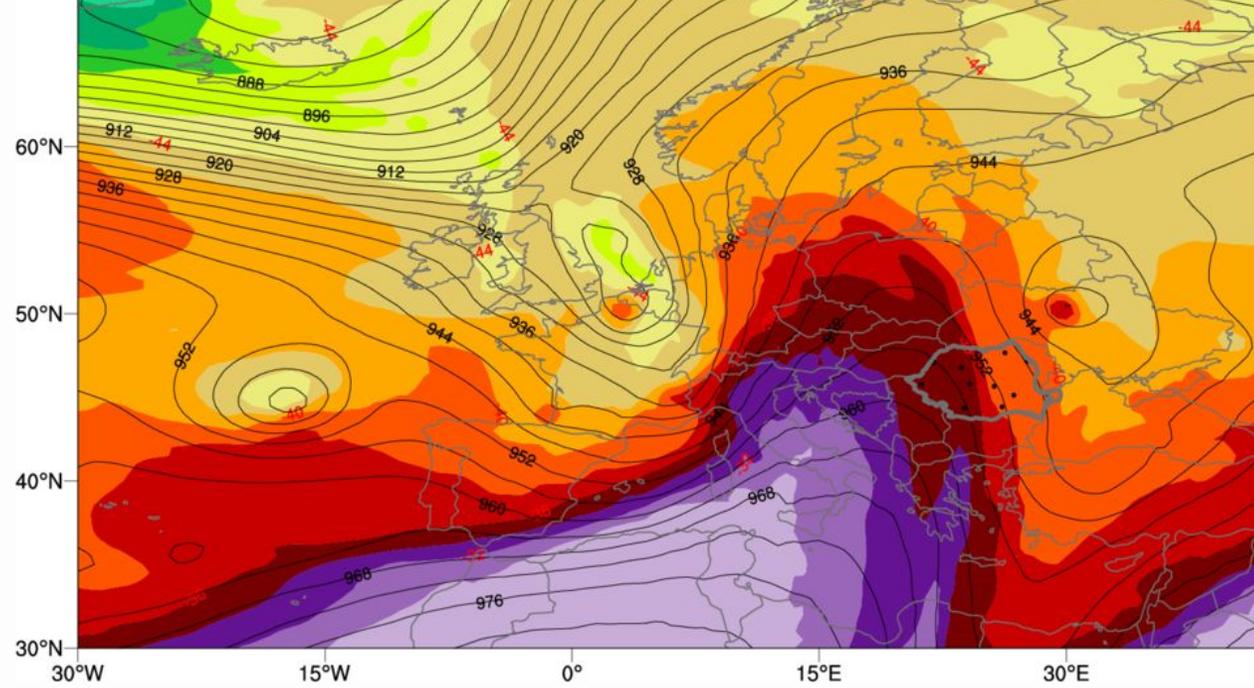


| Average temperature September (°C) | |
|------------------------------------|-------------|
| Normala (1961-1990) | 15,0 |
| Normala (1971-2000) | 14,3 |
| Normala (1981-2010) | 15,0 |
| 2024/09/01 - 2024/09/30 | 17,2 |
| Abatere (1961-1990) | 2,2 |
| Abatere (1971-2000) | 2,9 |
| Abatere (1981-2010) | 2,2 |

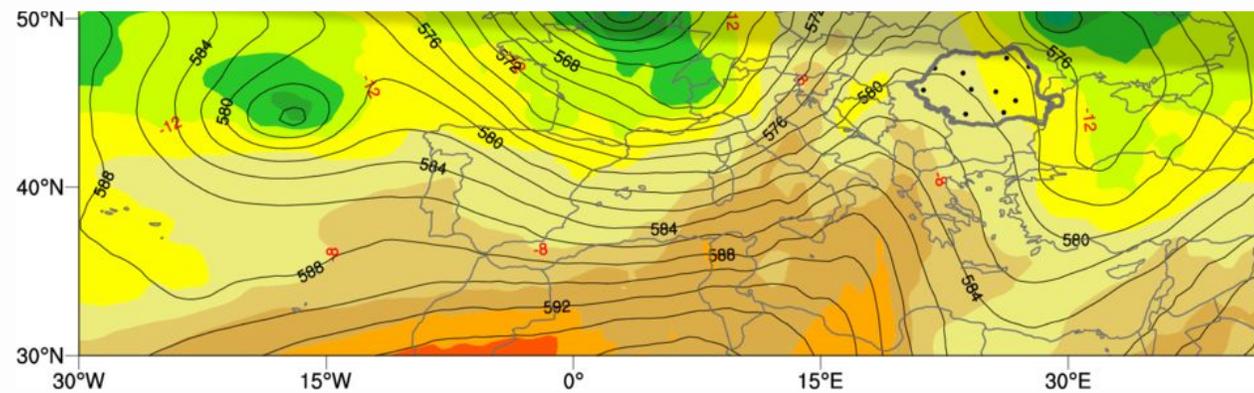
| crt. no. | Meteorological station | Monthly precipitation (mm) record | Year of recording | Monthly precipitation (mm), September 2024 |
|----------|--------------------------|-----------------------------------|-------------------|--|
| 1 | Bacău | 207,9 | 1912 | 215,2 |
| 2 | Bârlad | 154,5 | 2007 | 160,9 |
| 3 | Bârnova (radar) | 85,3 | 2007 | 211,8 |
| 4 | Cernavodă | 120,3 | 1999 | 129,9 |
| 5 | Constanța | 149,8 | 2005 | 153,4 |
| 6 | Negrești (Vaslui) | 160,3 | 1995 | 172,2 |
| 7 | Vaslui | 162,3 | 1904 | 200,8 |

| Average monthly precipitation in September (mm) | |
|---|--------------|
| Normala (1961-1990) | 42,0 |
| Normala (1971-2000) | 49,4 |
| Normala (1981-2010) | 48,8 |
| 2024/09/01 - 2024/09/30 | 135,6 |
| Abatere (1961-1990) | 93,6 |
| Abatere (1971-2000) | 86,2 |
| Abatere (1981-2010) | 86,8 |

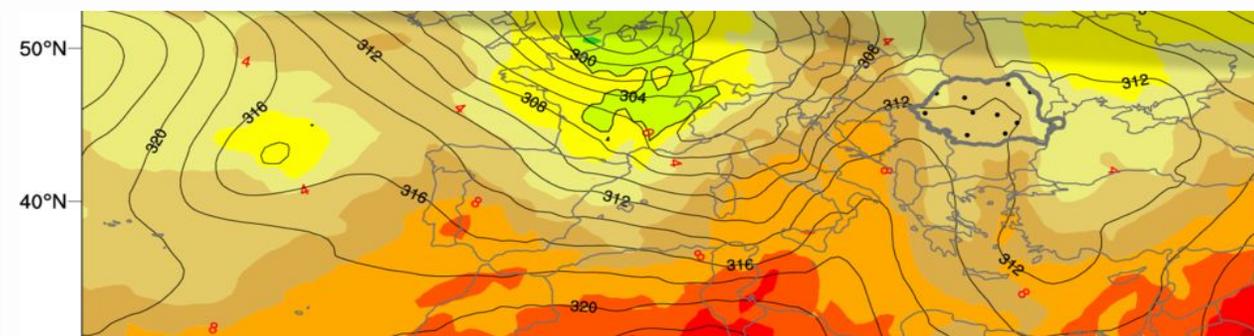
September 9th
2024 h00



300 hPa

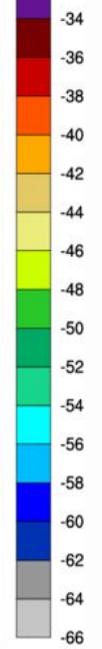
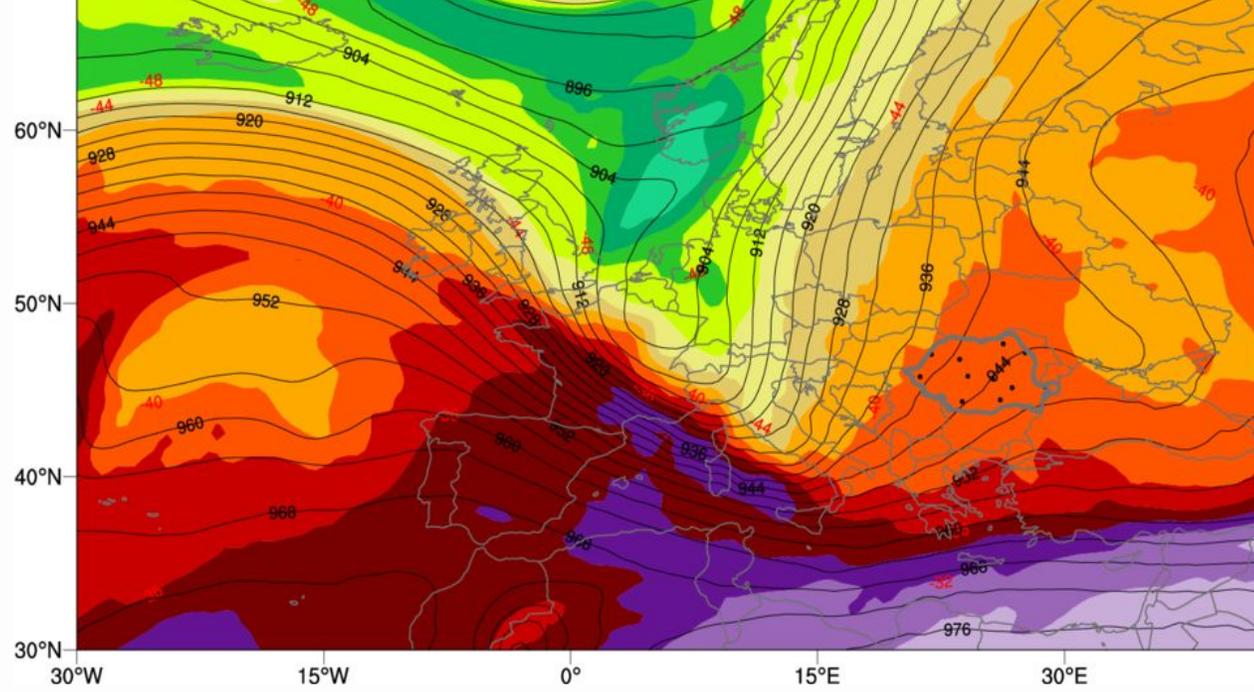


500 hPa

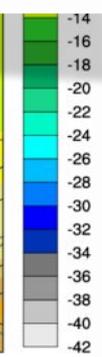
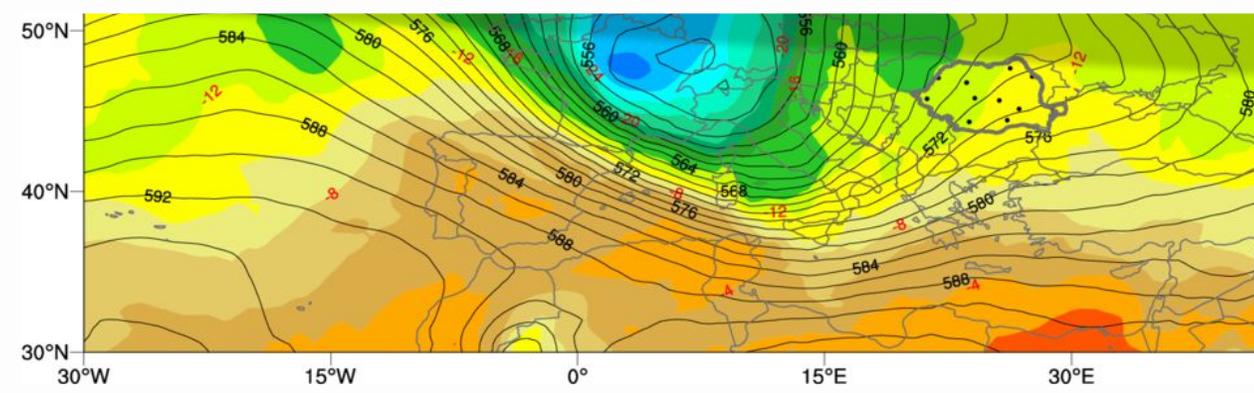


700 hPa

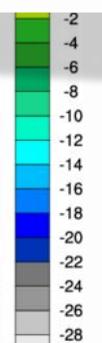
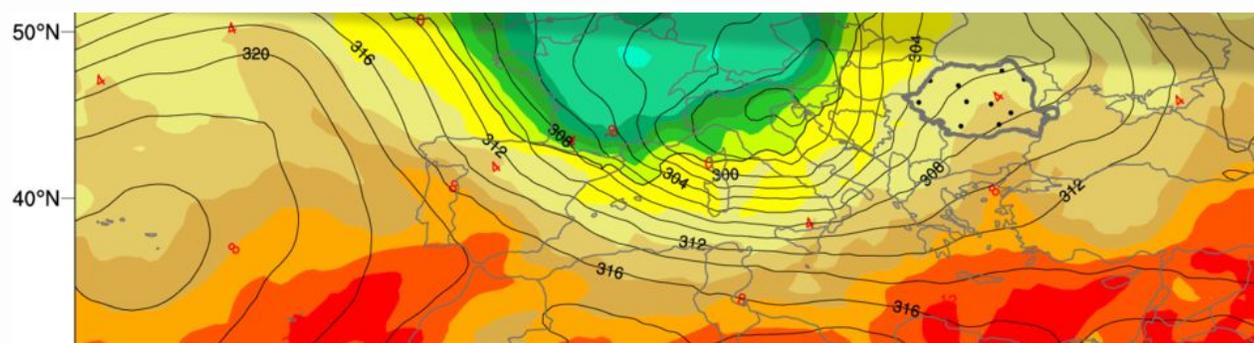
September 13th
2024 h00



300 hPa

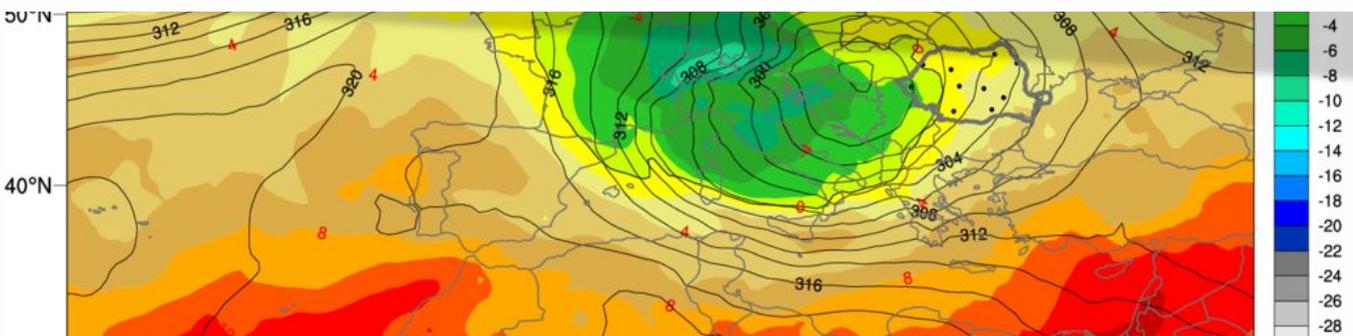
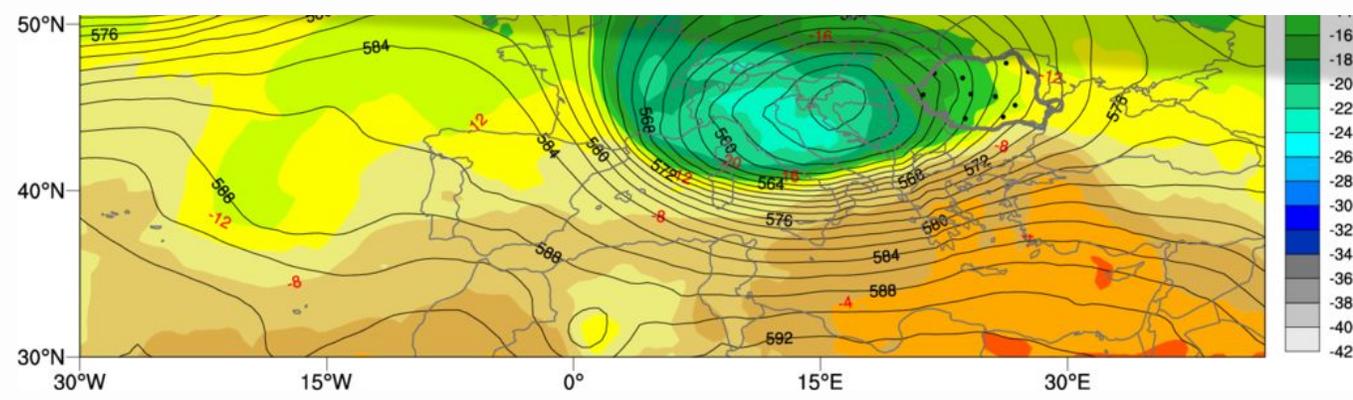
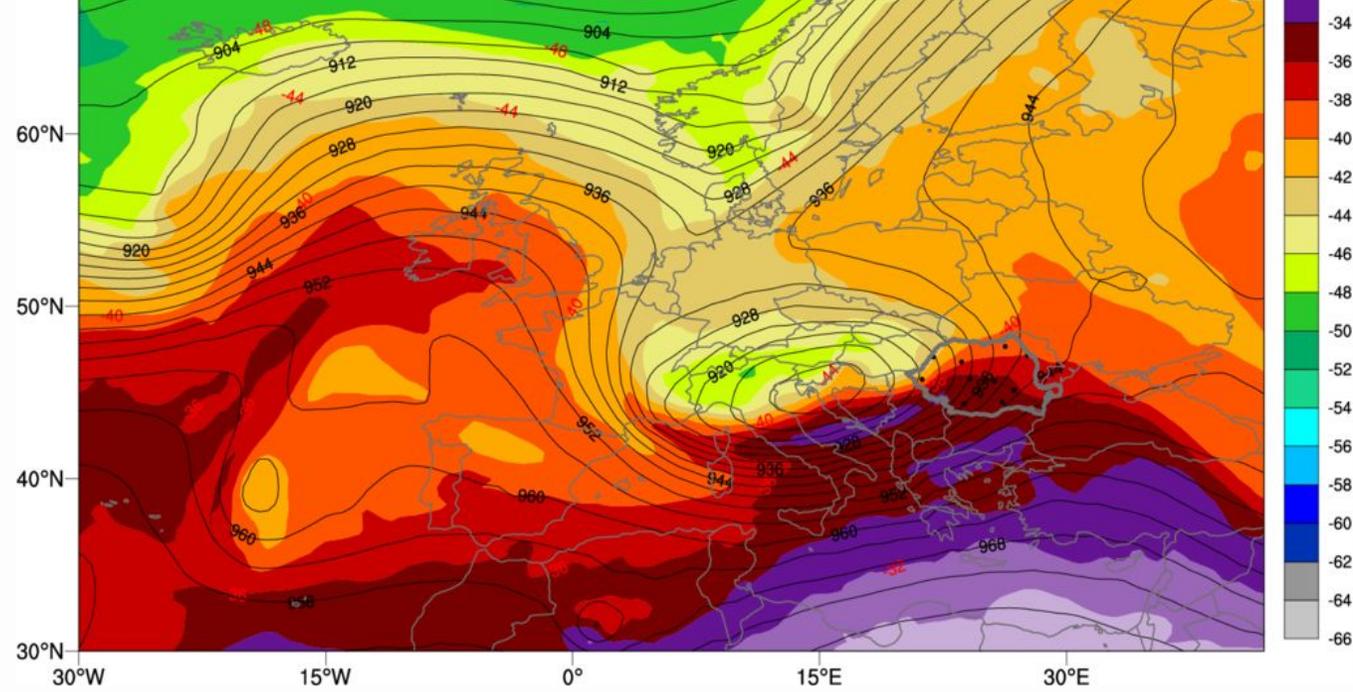


500 hPa

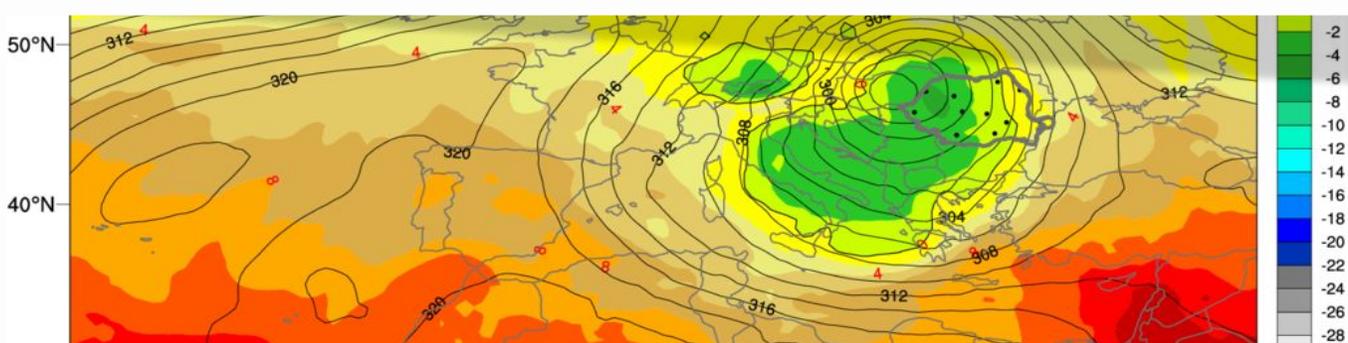
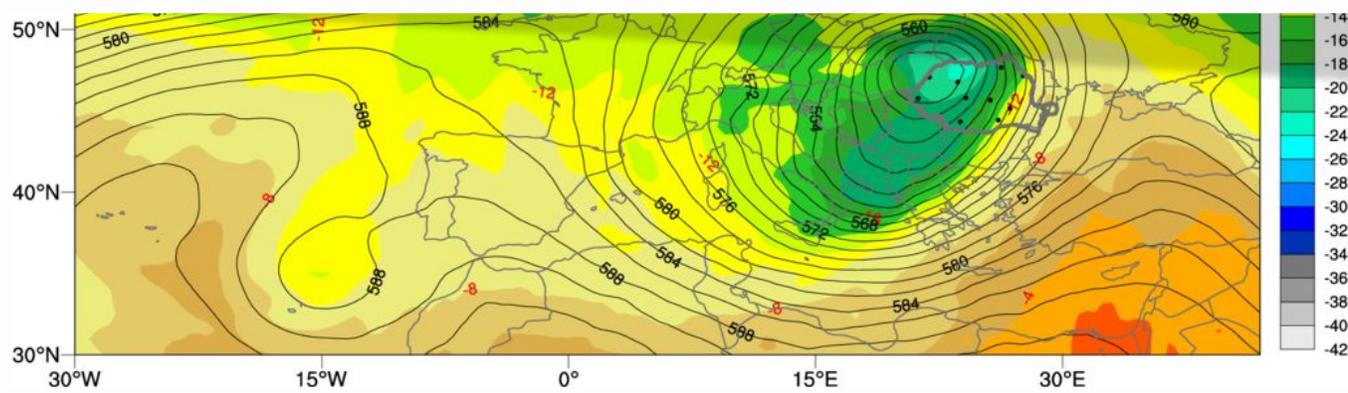
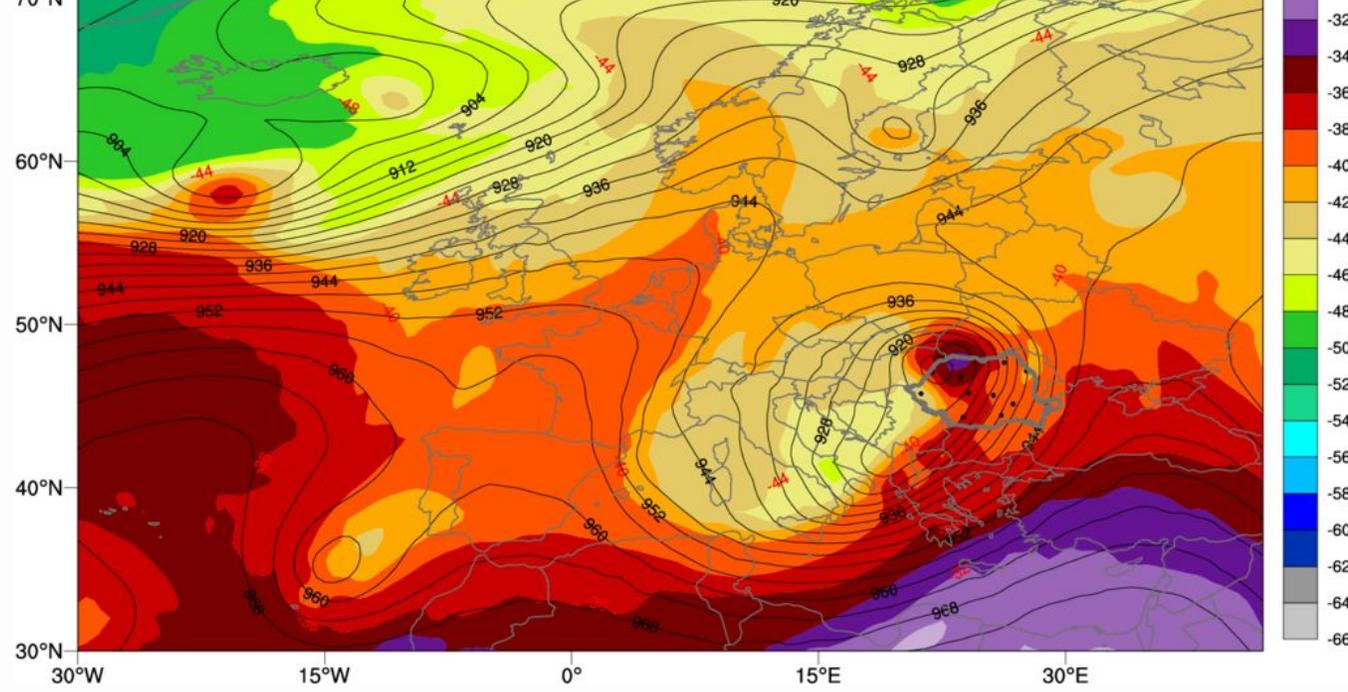


700 hPa

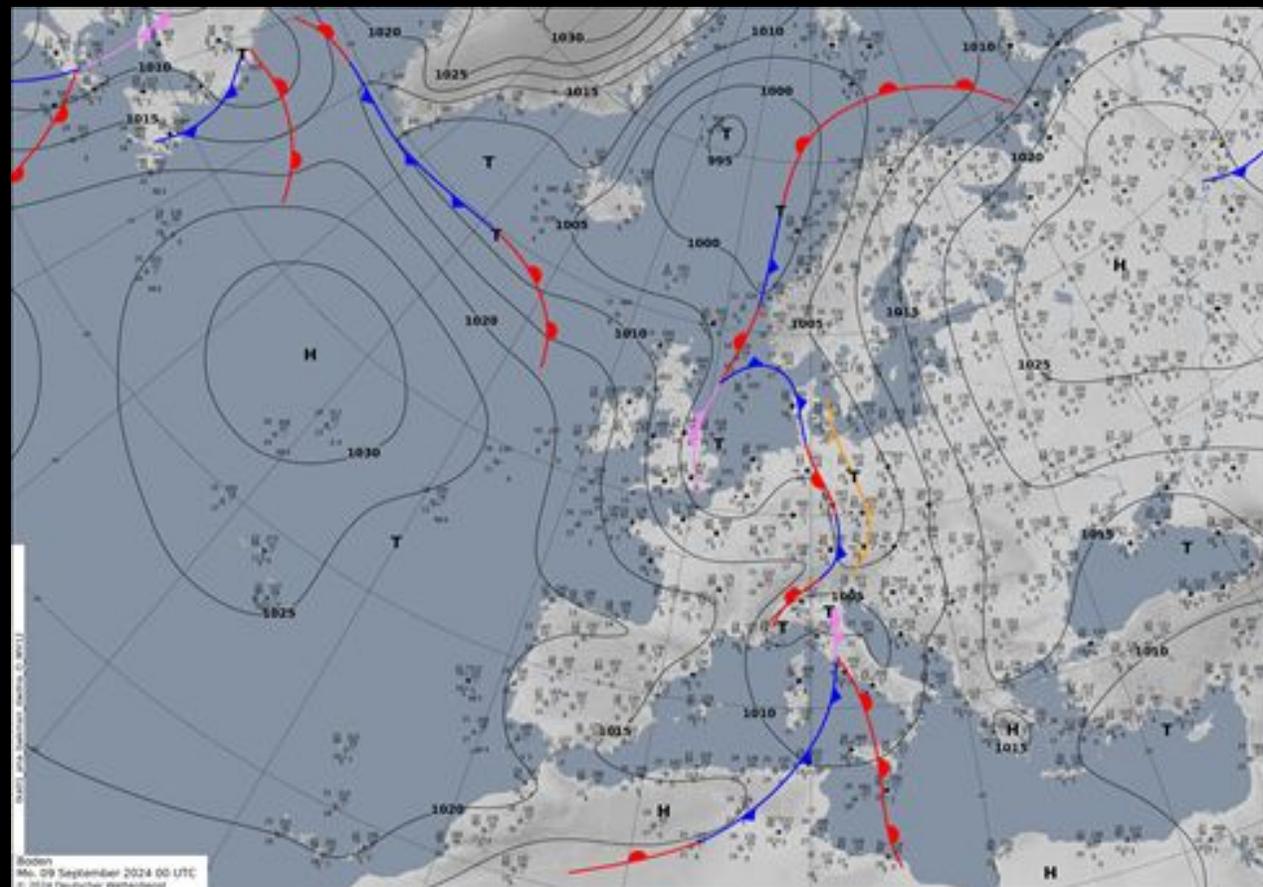
September 14th
2024 h00



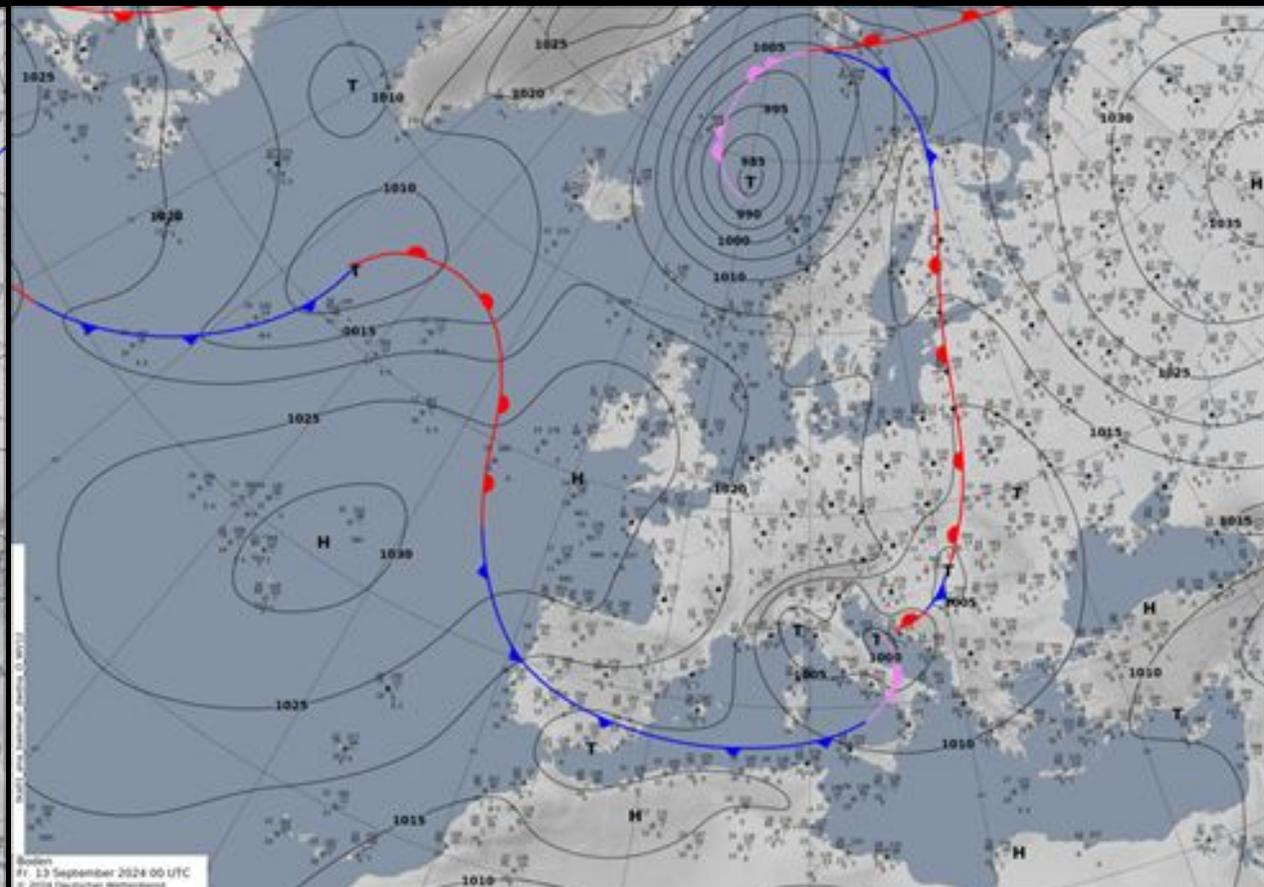
September 9th
2024 h00

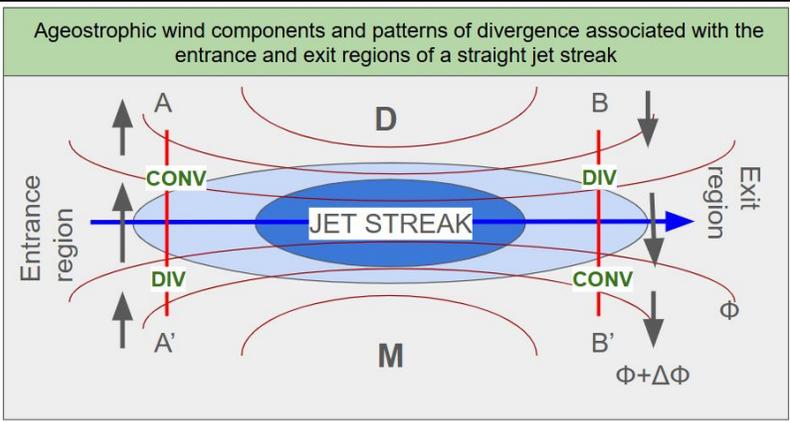


September 9th 2024 h00



September 13th 2024 h00





Polar maritime air mass

Polar continental air mass

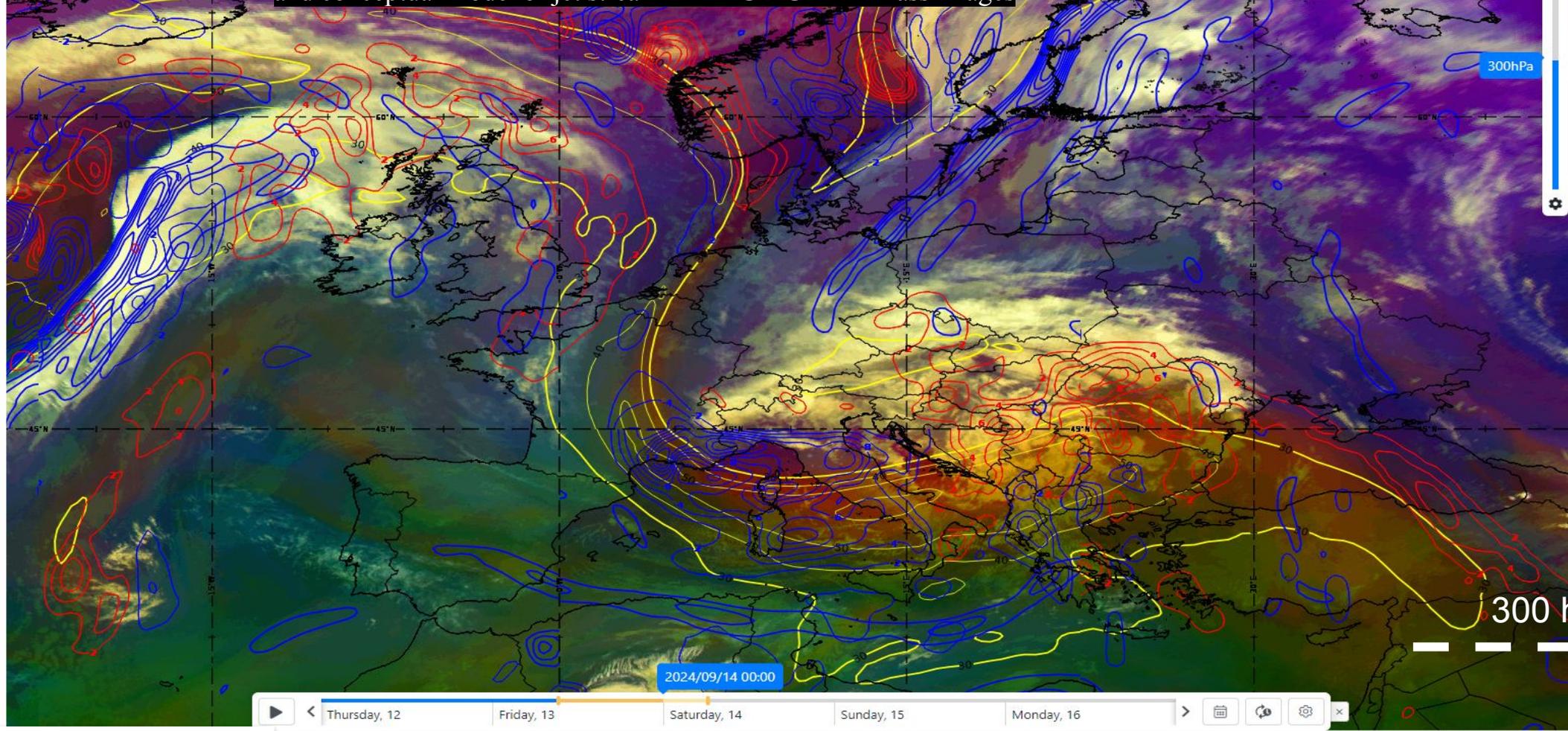
jet streak in high troposphere

Tropical maritime air mass

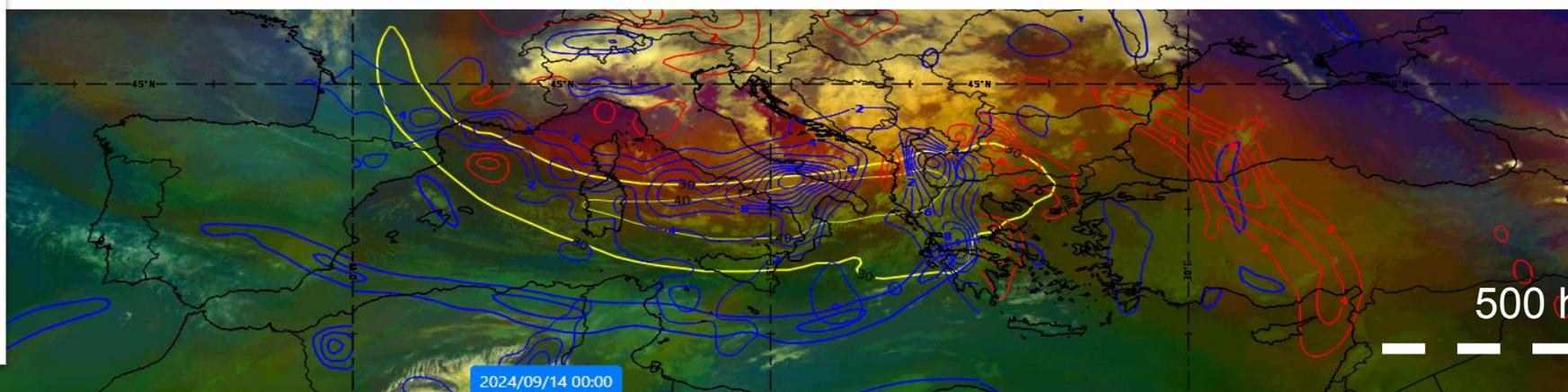
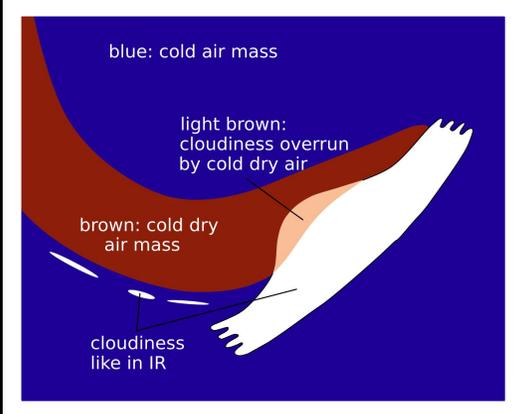
2024/09/13 18:00

Friday, 13 Saturday, 14 Sunday, 15 Monday, 16 Tuesday, 17

300 hPa

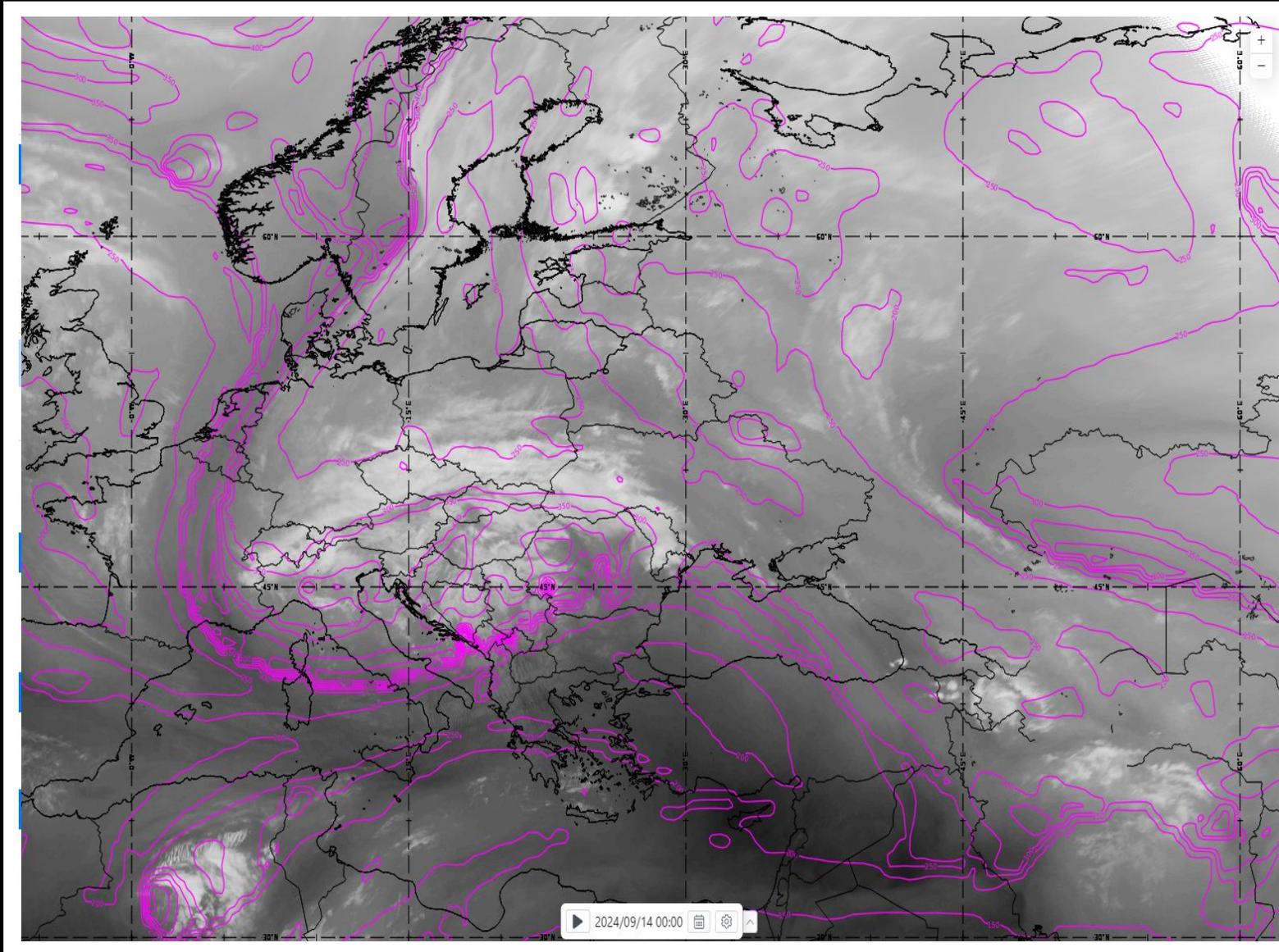


300 hPa

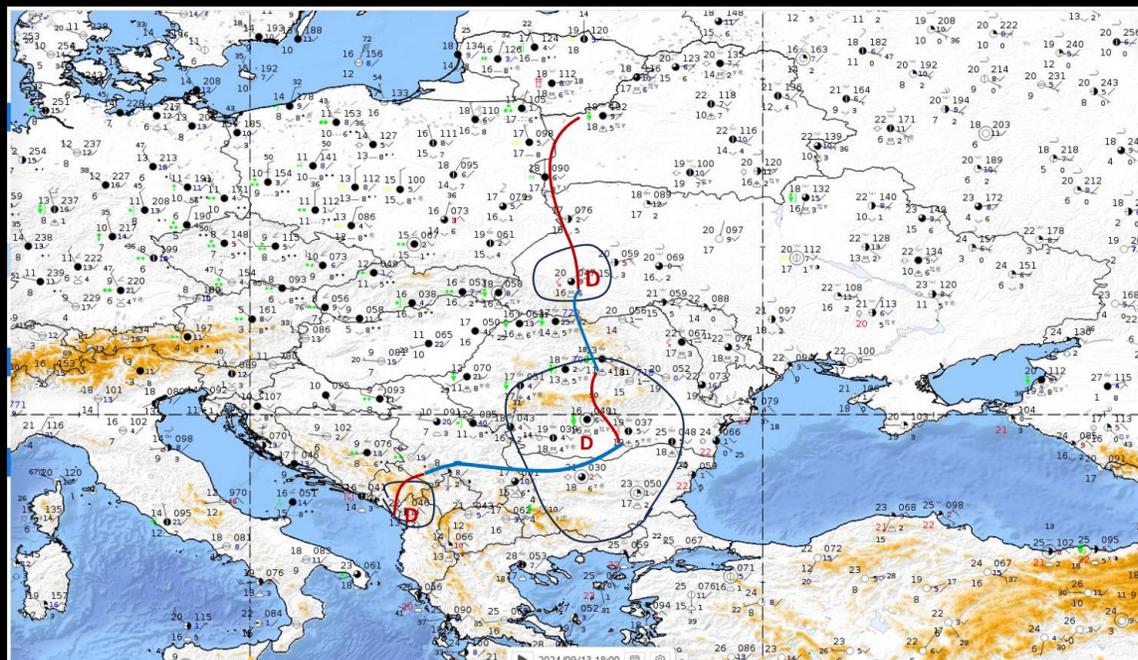


500 hPa

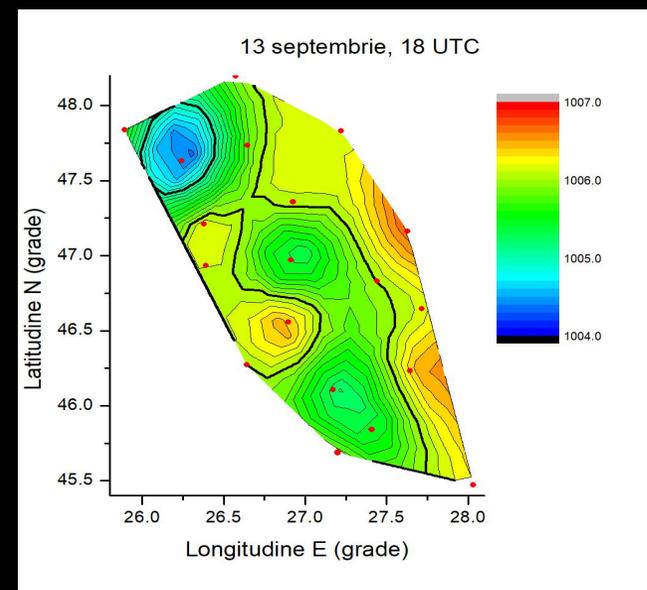
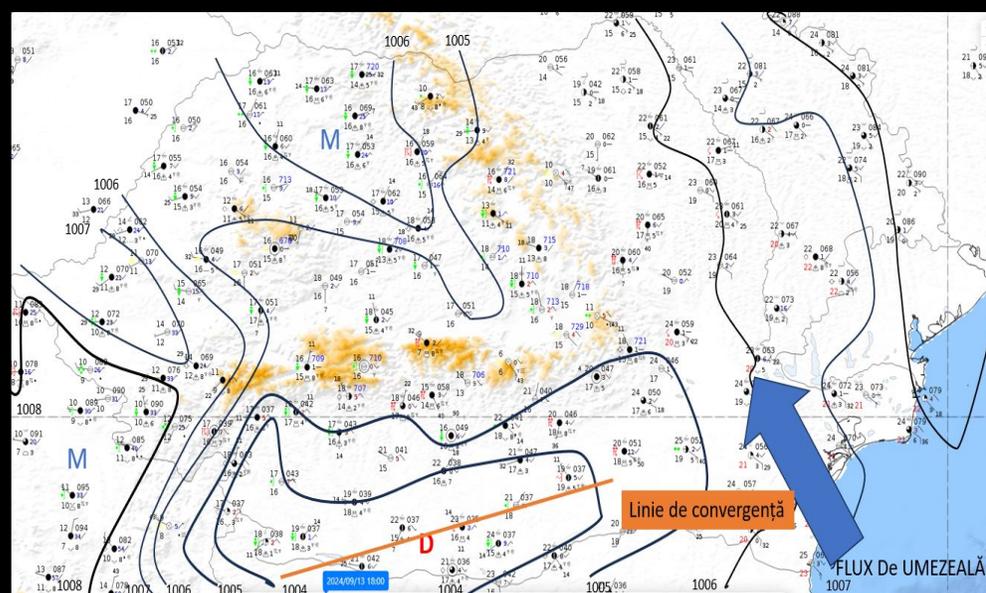
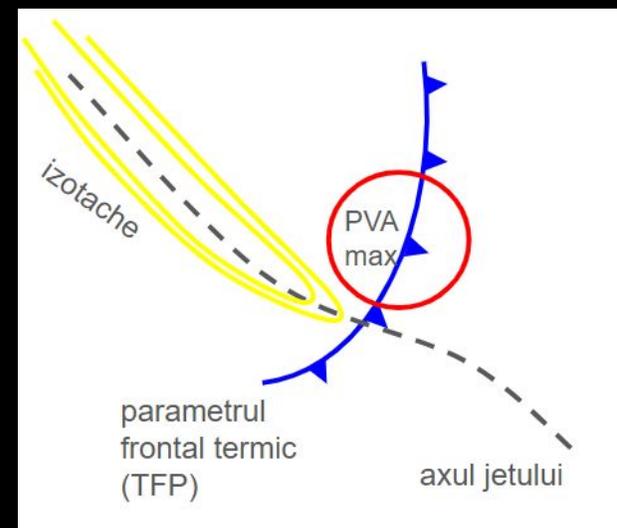
PV 1.5 level on 14.09.2024 h00 UTC and MSG WV 6,2 μm
- Indicates the presence of tropospheric currents down to 500 hPa level



mesoscale and synoptic pressure field analysis



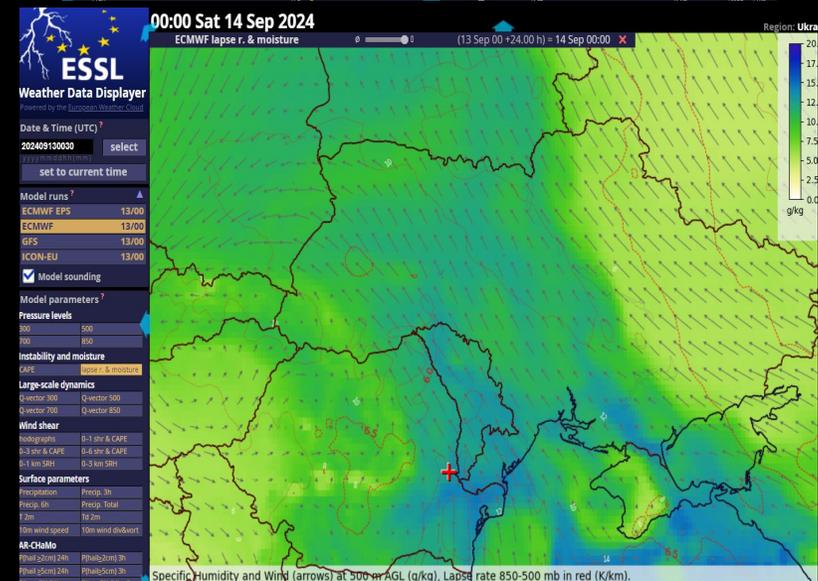
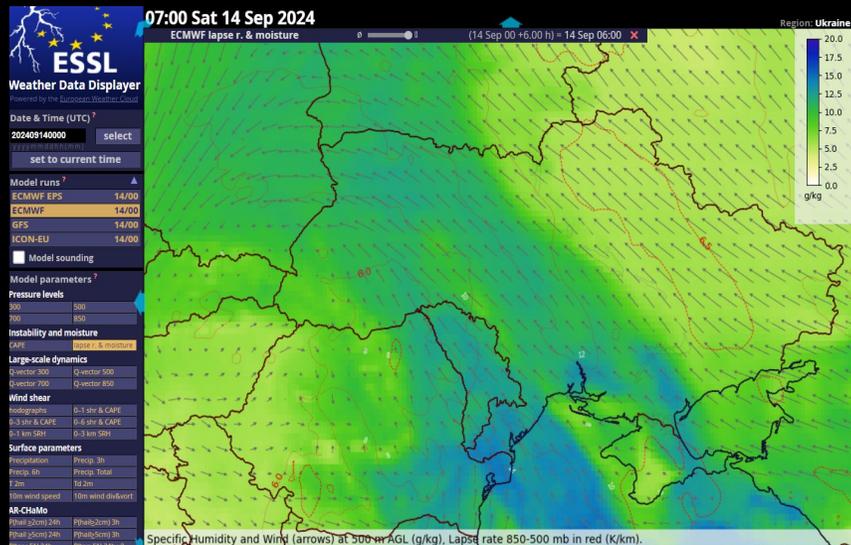
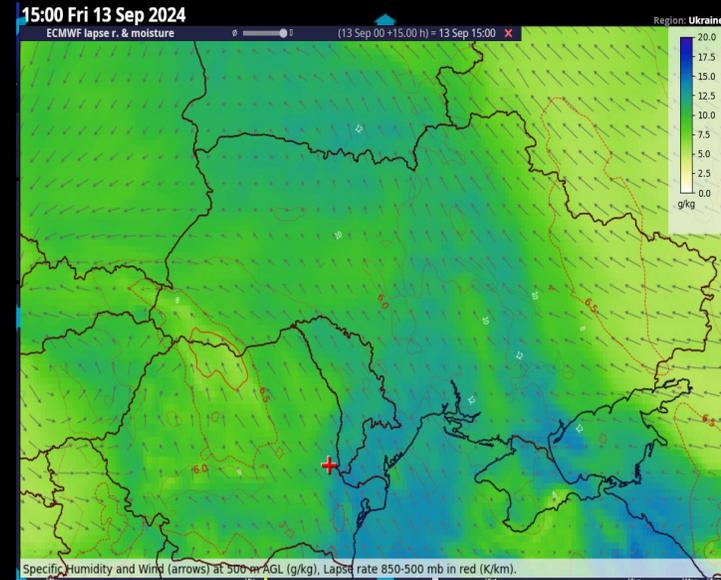
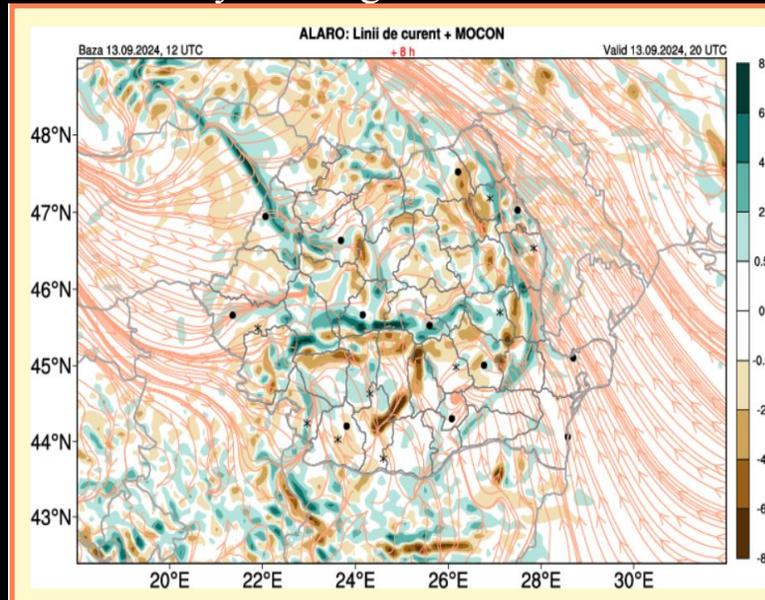
max vorticity advection when crossing a cold front



ECMWF: Specific humidity and wind speed at 500 m on September 13, 15 UTC and September 14, 00 UTC, 06 UTC

ALARO: stream lines + humidity convergence

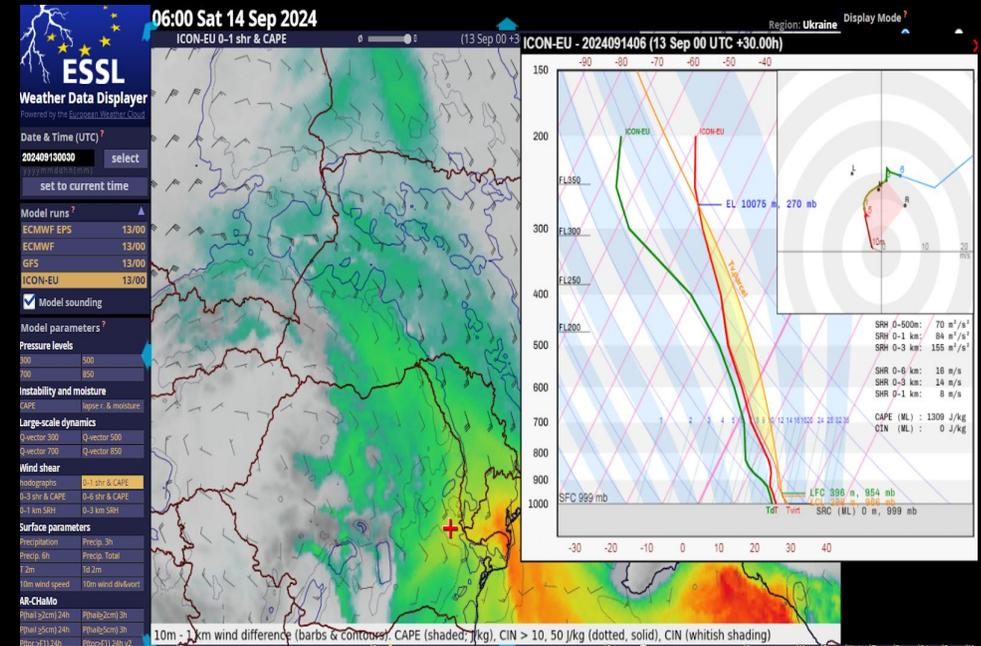
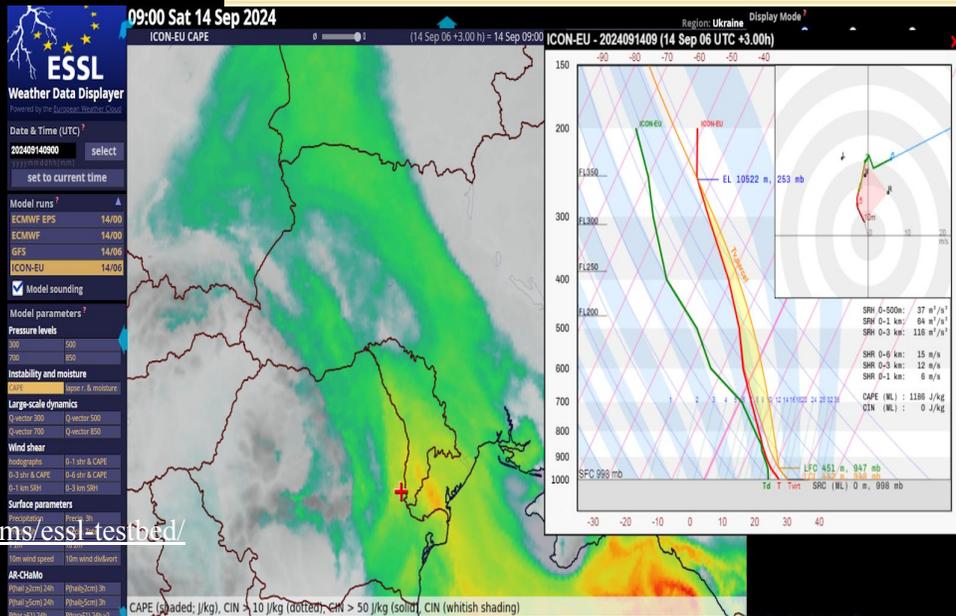
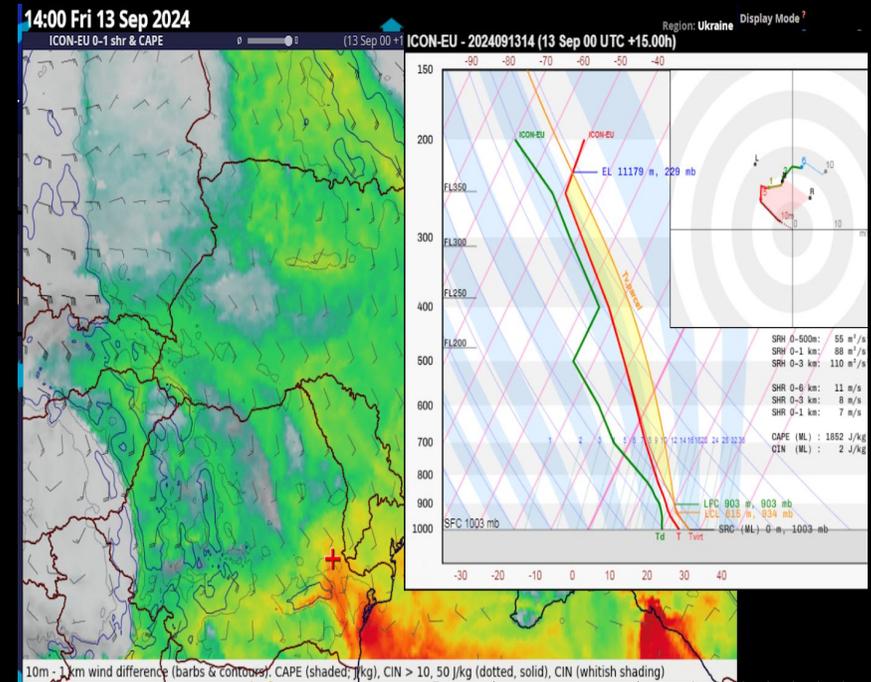
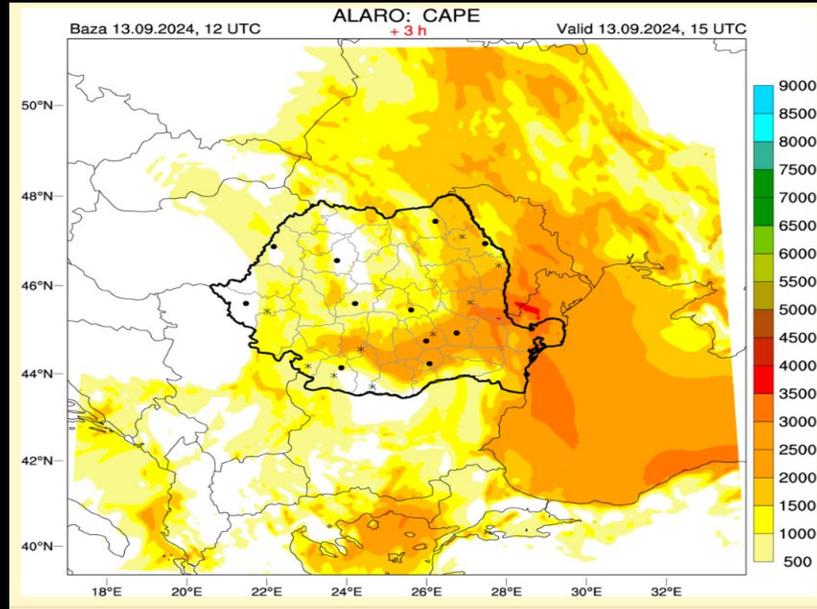
ALARO: stream lines + humidity convergence



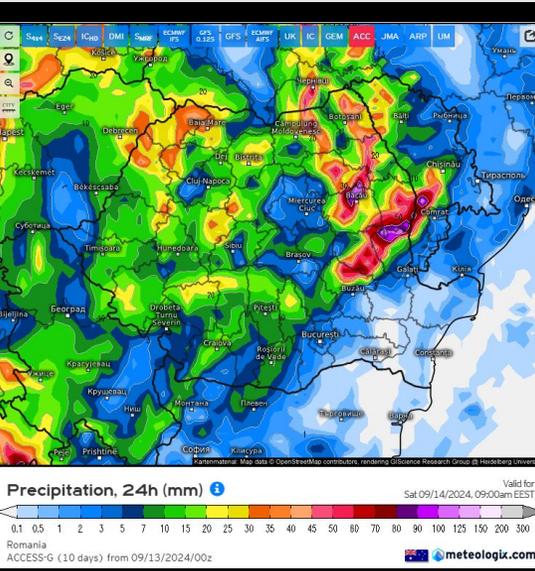
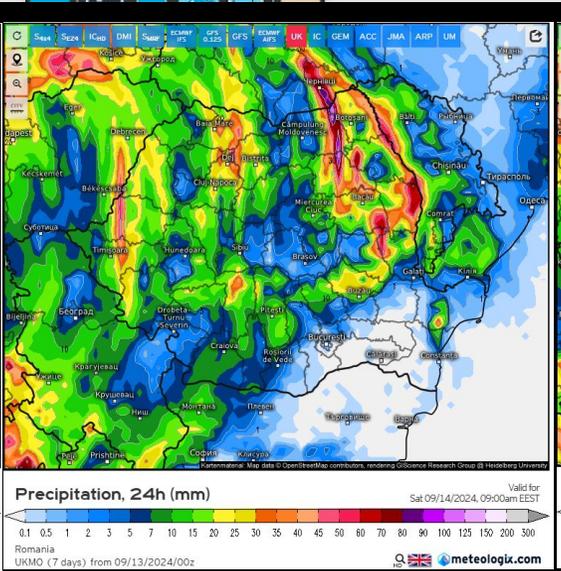
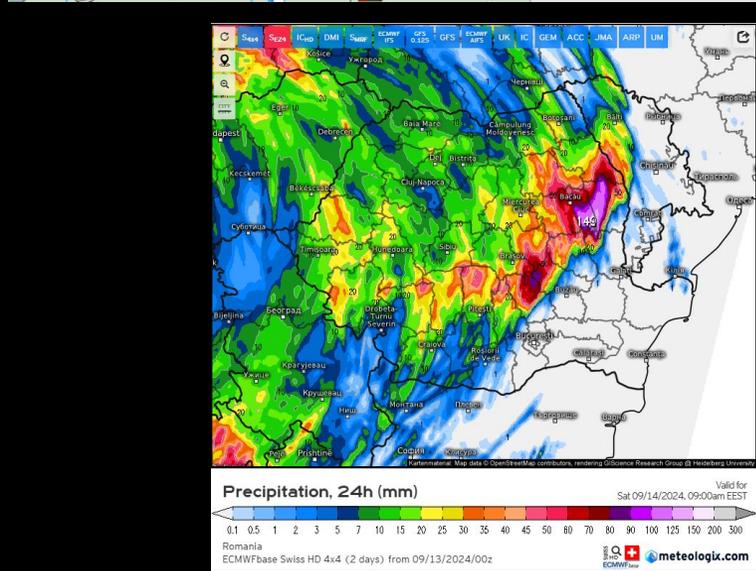
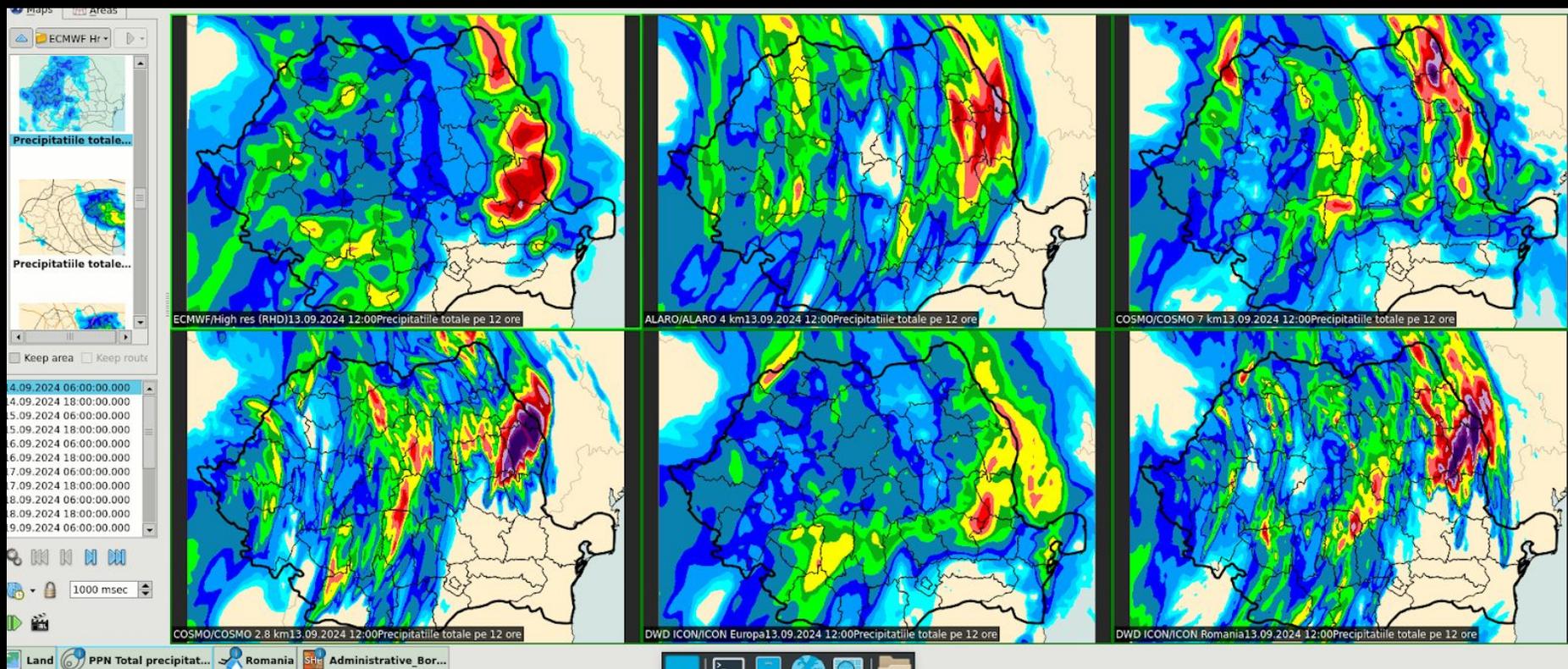
ICON: SHEAR coefficient and CAPE (convective potential energy),

Cape: peste 1800 J/Kg

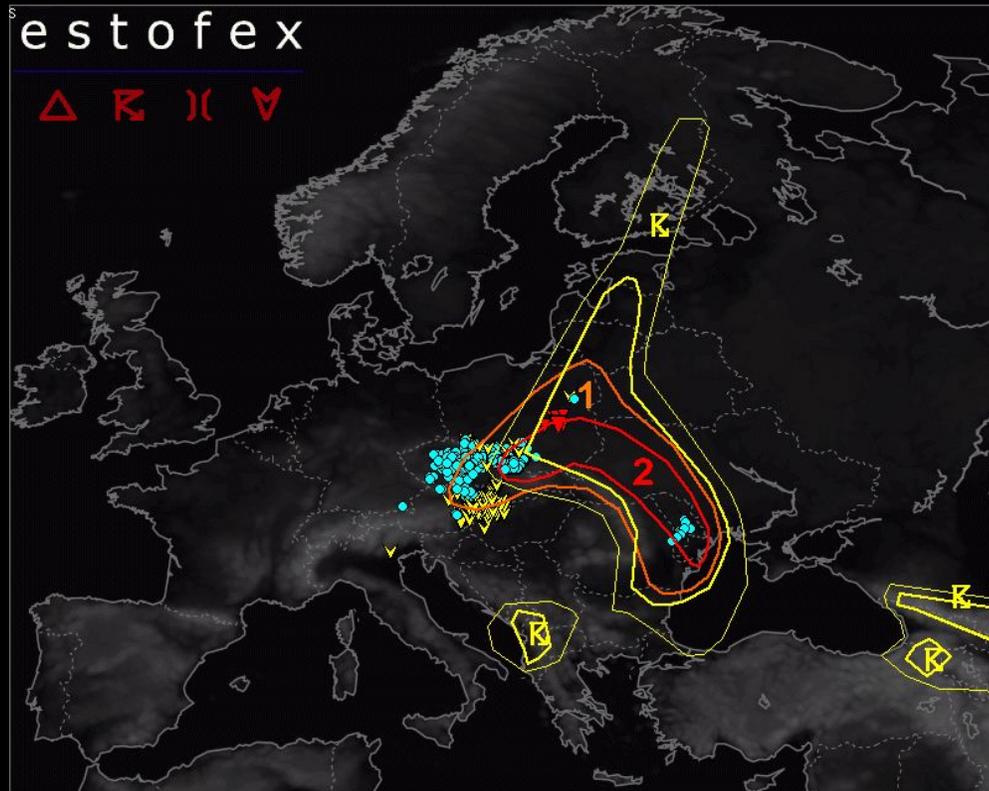
ALARO: CAPE



<https://www.essl.org/cms/essl-testbed/>



estofex forecast for 14th-15th September 2024



Storm Forecast valid Sat 14 Sep 2024 06:00 – Sun 15 Sep 2024 06:00 UTC
 Issued: Fri 13 Sep 2024 21:54 UTC. Forecaster: PUCIK
 Reported severe weather is plotted on the above map, source: www.eswd.eu (courtesy of ESSL)
 Legend: tornadoes (red); heavy rain (cyan); large hail (green); severe winds (yellow)
 (C) ESTOFEX

| level | probability of occurrence within 40 km of a point |
|---------|---|
| level 1 | 5% severe |
| level 2 | 15% severe |
| level 3 | 15% extremely severe |
| — | 50% lightning |
| — | 15% lightning |

<https://www.estofex.org/>



GUVERNUL ROMÂNIEI

MINISTERUL MEDIULUI, APELOR ȘI PĂDURILOR



METEO ROMANIA

ADMINISTRAȚIA NAȚIONALĂ DE METEOROLOGIE

ADMINISTRAȚIA NAȚIONALĂ DE METEOROLOGIE

| | |
|--------------------------------------|------------------|
| Ziua/Luna/Anul/Ora: 13.09.2024 10:00 | Număr Mesaj: 127 |
|--------------------------------------|------------------|

COD PORTOCALIU

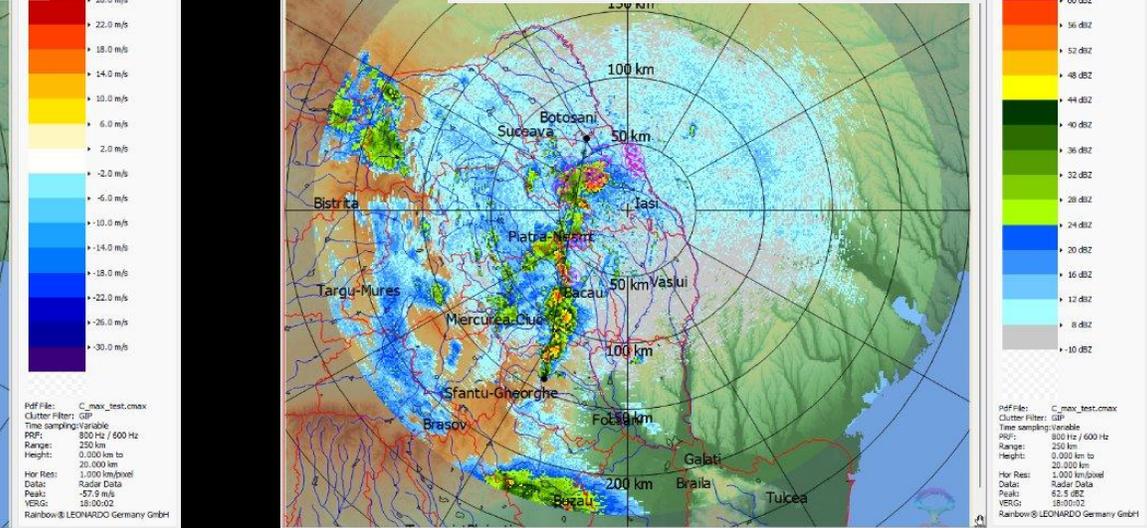
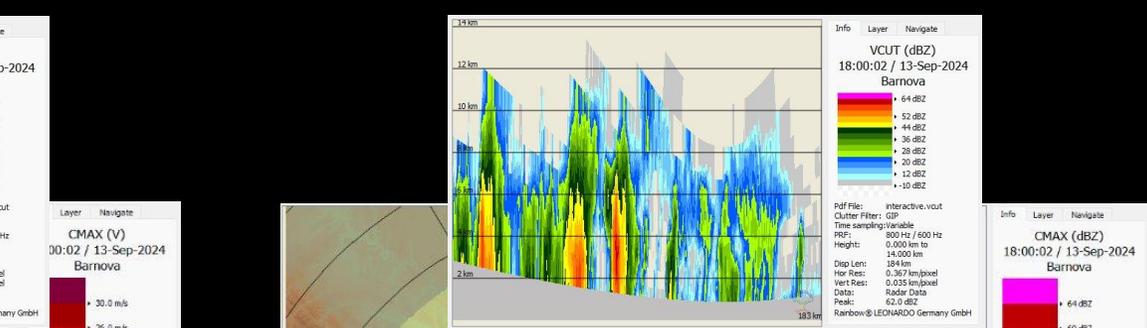
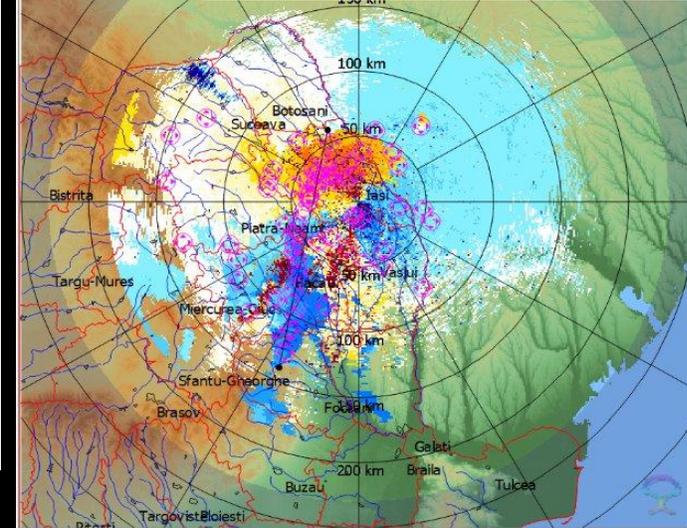
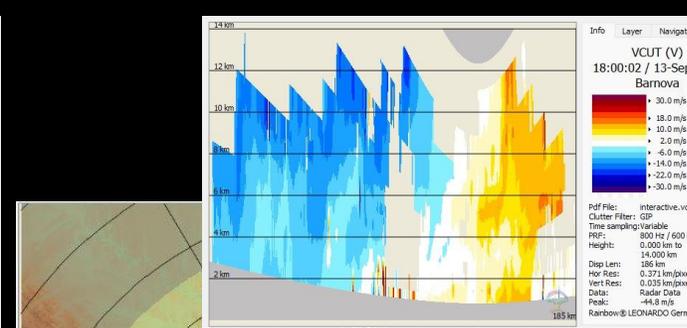
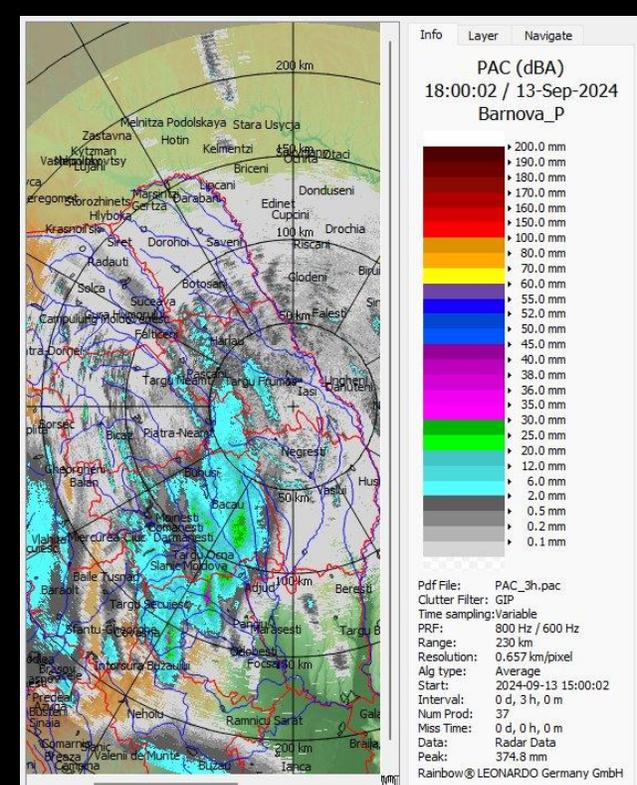
Interval de valabilitate: 13 septembrie, ora 18 – 14 septembrie, ora 15
Fenomene vizate: averse torențiale și importante cantitativ
Zone afectate: județele Buzău, Vrancea, Galați, Vaslui, Bacău, Neamț, Iași, Botoșani și Suceava

În intervalul menționat, în județele Buzău, Vrancea, Galați, Vaslui, Bacău, Neamț, Iași, Botoșani și Suceava vor fi perioade cu averse torențiale. În intervale scurte de timp sau prin acumulare cantitățile de apă vor fi de 40...60 l/mp și izolat de peste 70...80 l/mp.

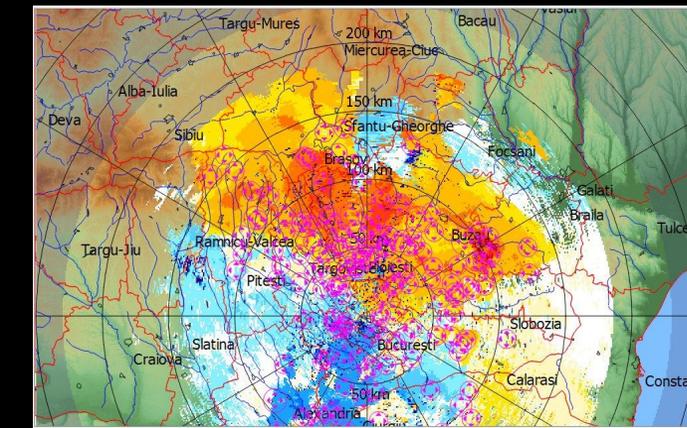


În funcție de evoluția și intensitatea fenomenelor meteorologice, Administrația Națională de Meteorologie va actualiza prezentul mesaj.

| | |
|---|--|
| Secția emitentă: Centrul Național de Prognoze Meteorologice București | Aprobat, Director Prognostic Meteorologică Dr. Florinela Georgescu |
|---|--|

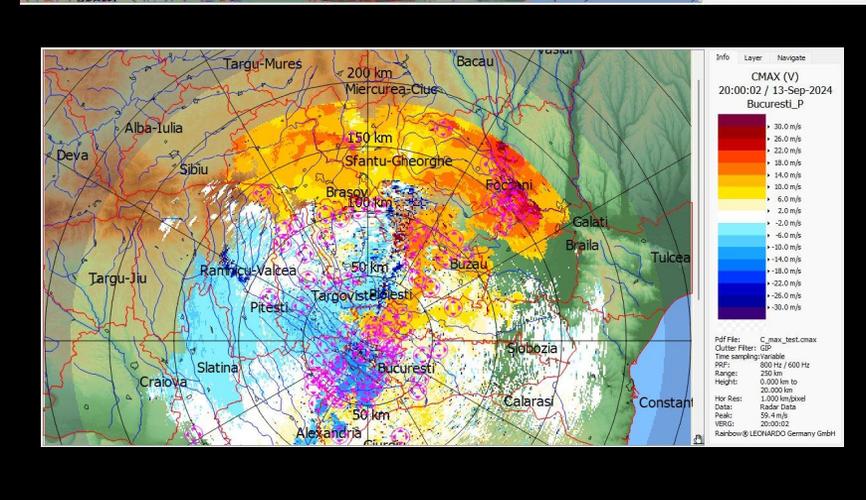
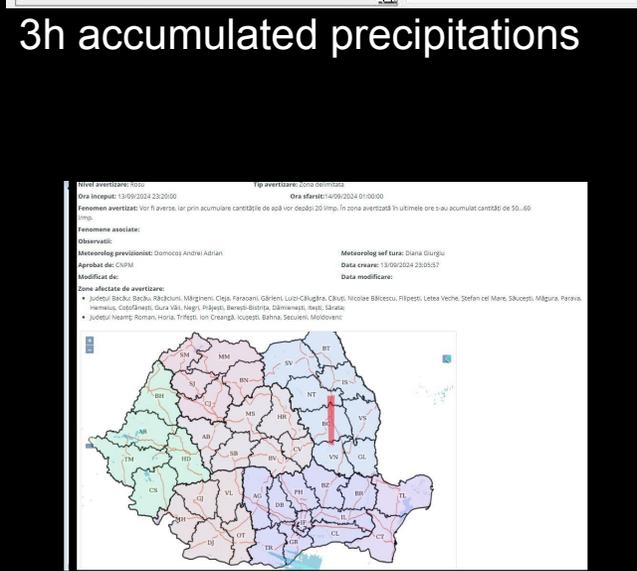
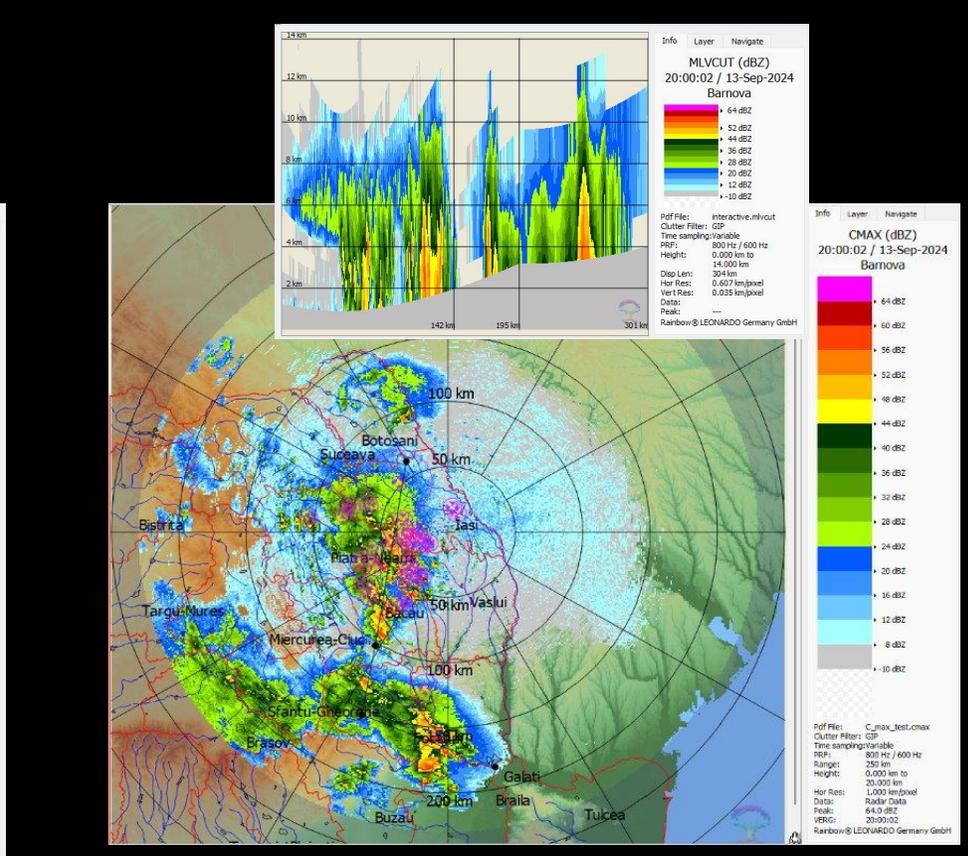
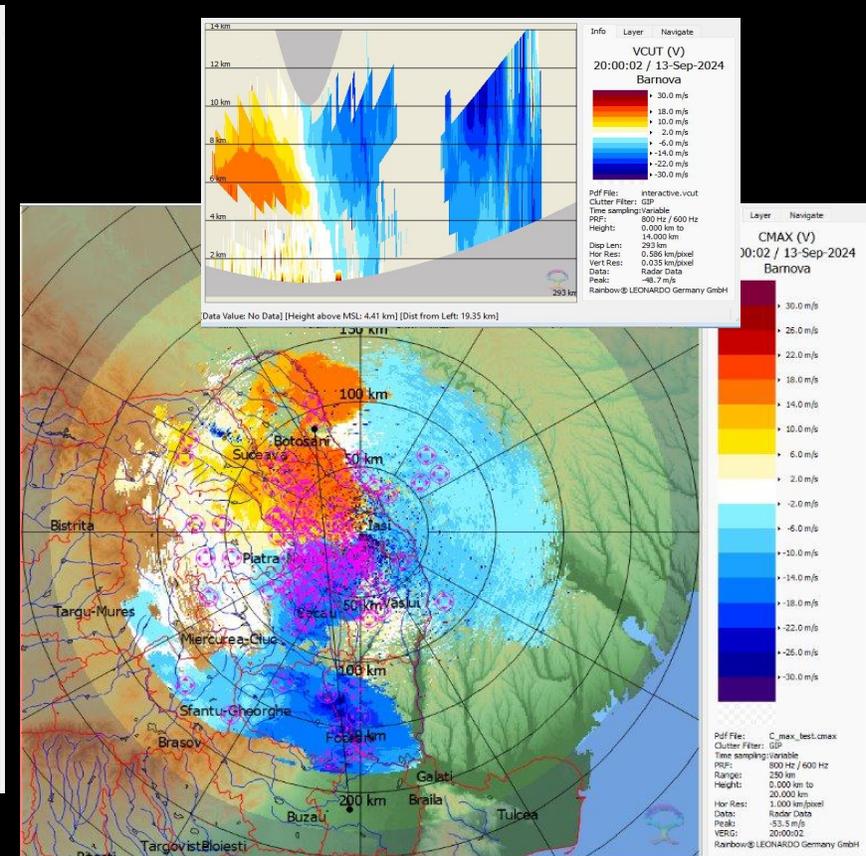
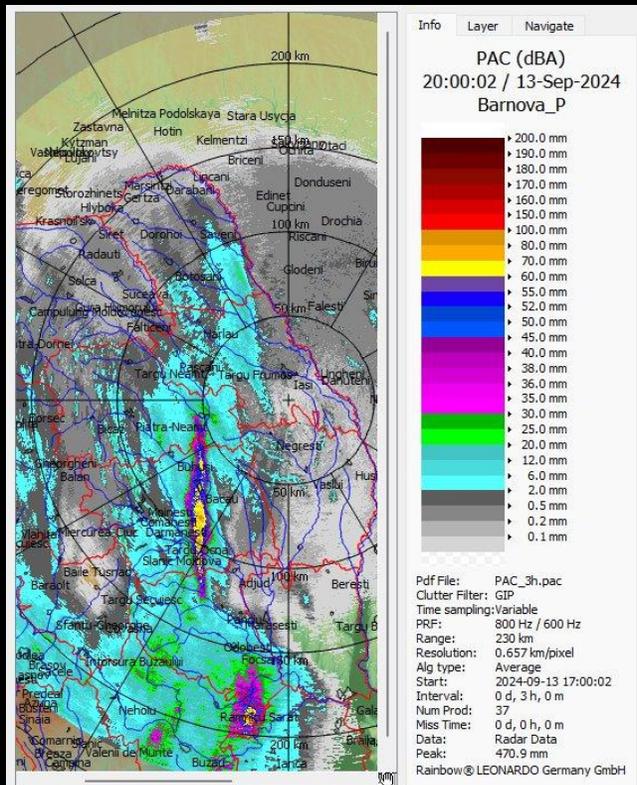


3h accumulated precipitations



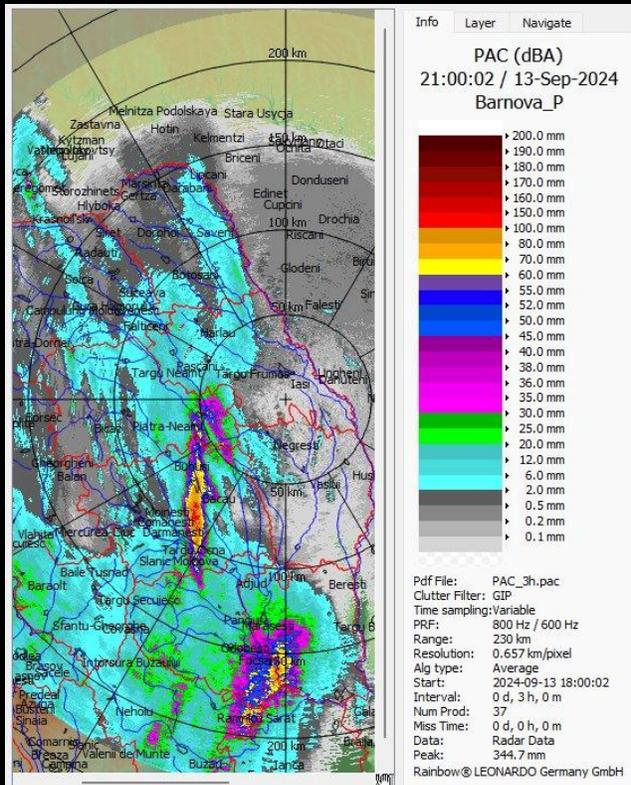
Maximum radial velocity + divergence

Maximum reflectivity + convergence

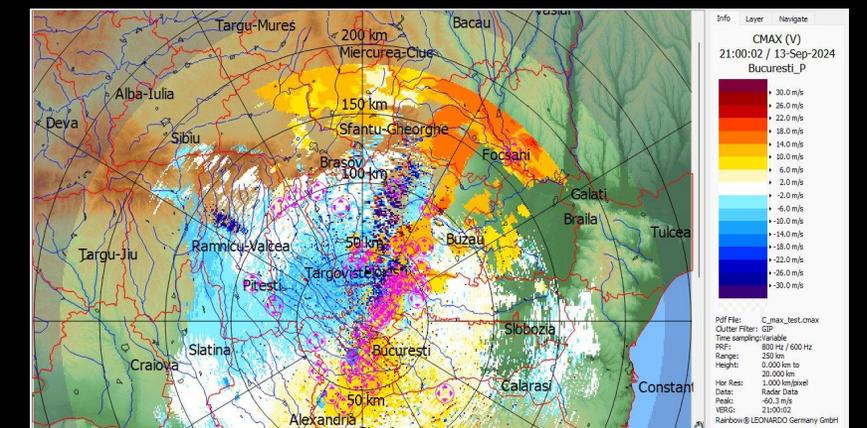
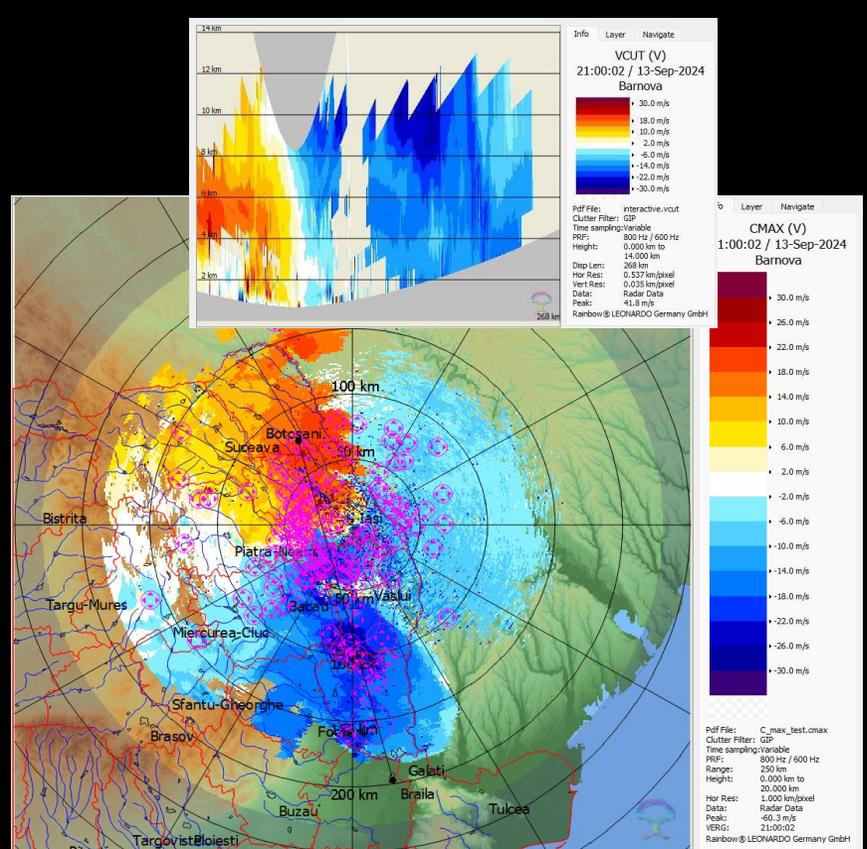


Maximum radial velocity + divergence

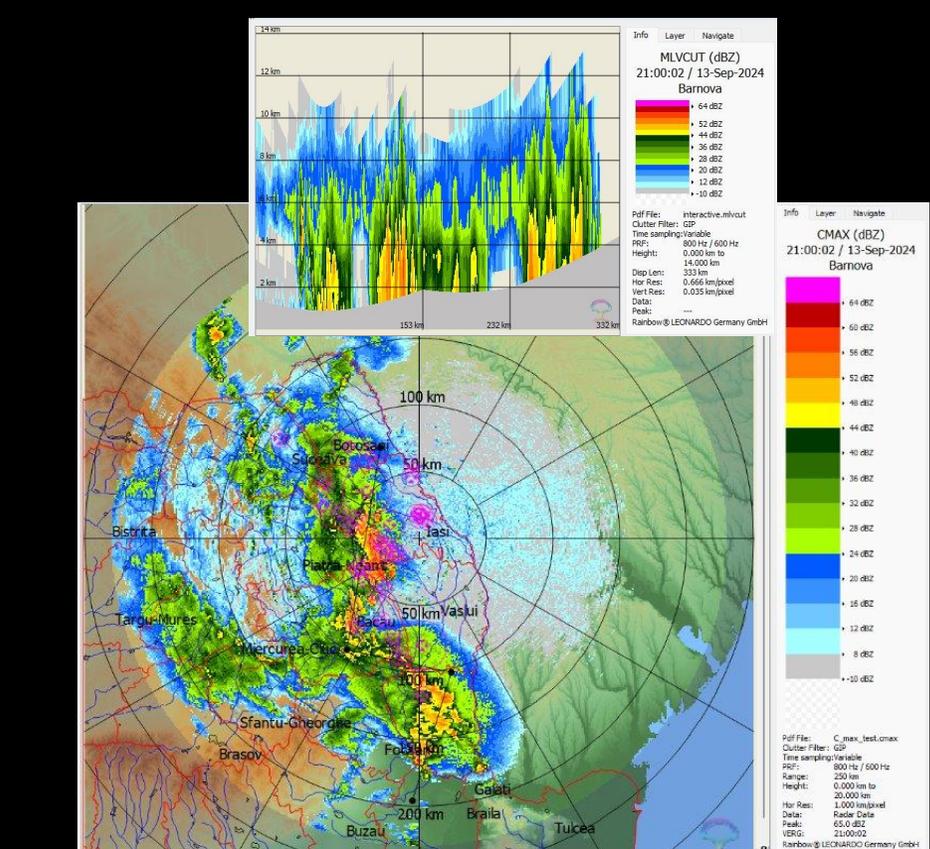
Maximum reflectivity + convergence



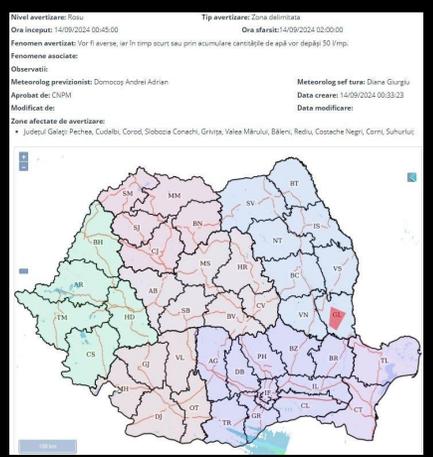
3h accumulated precipitations

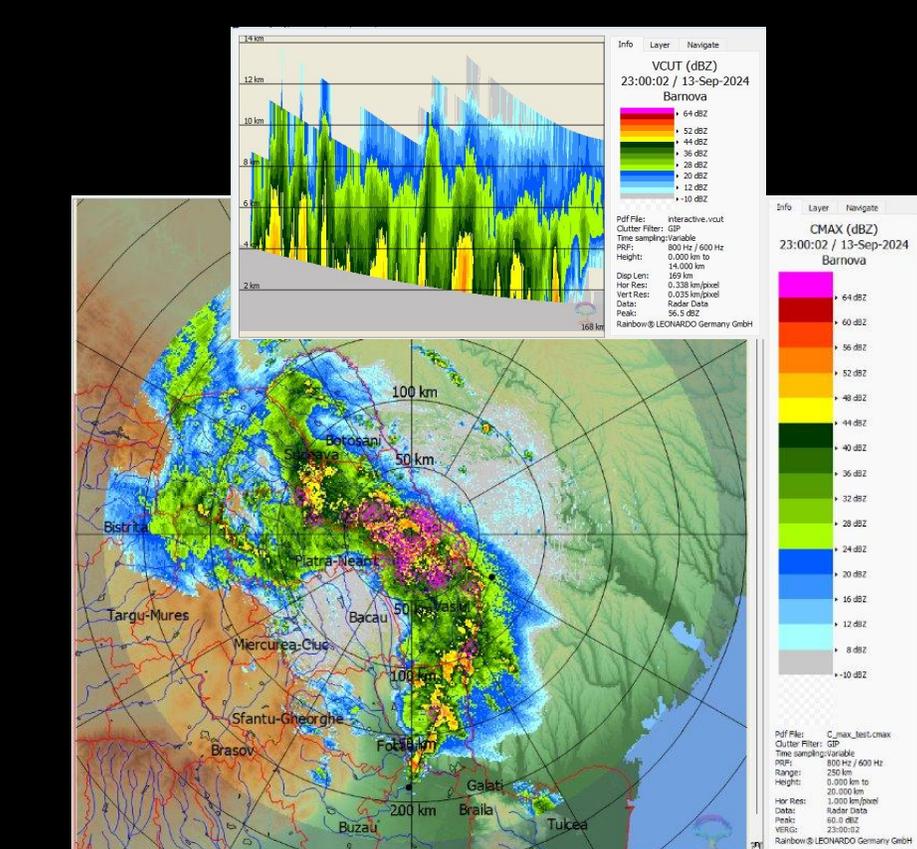
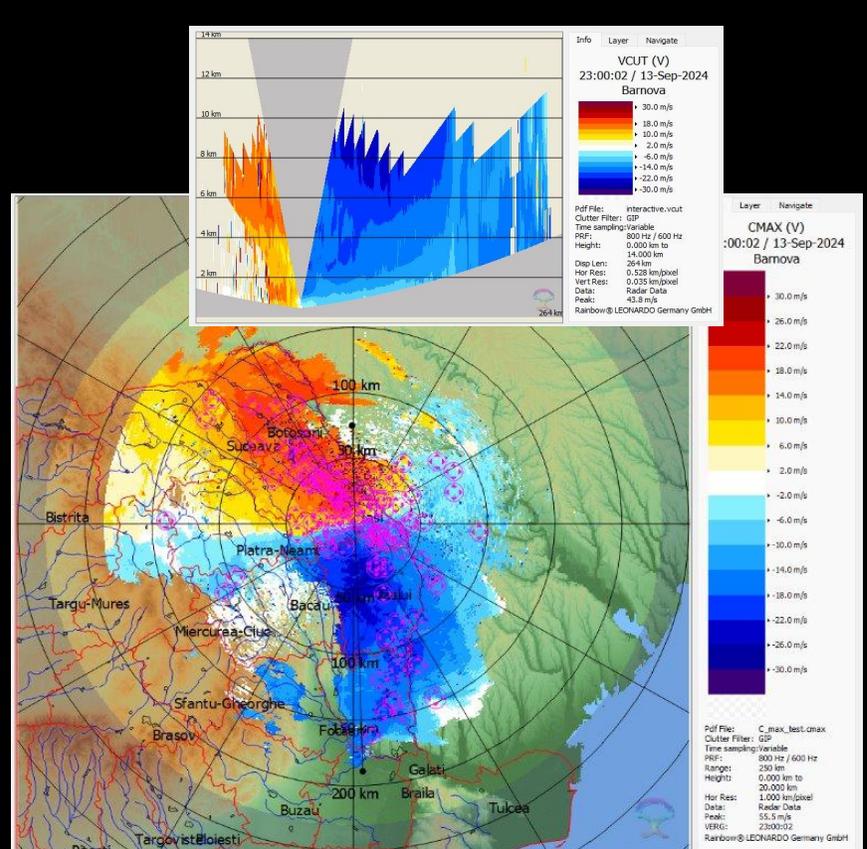
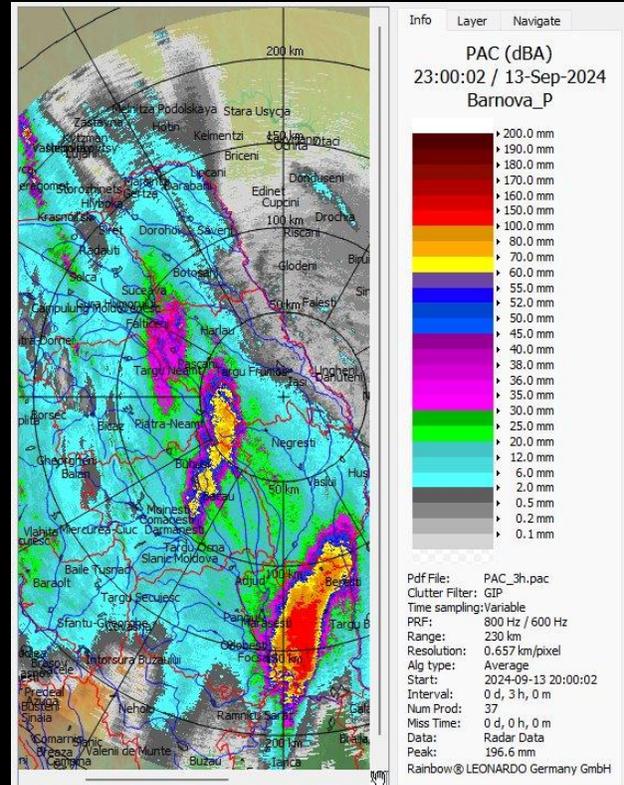


Maximum radial velocity + divergence

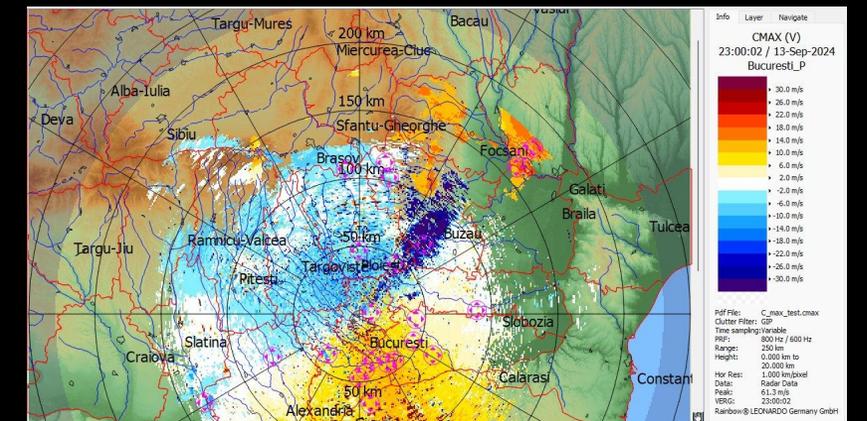


Maximum reflectivity + convergence



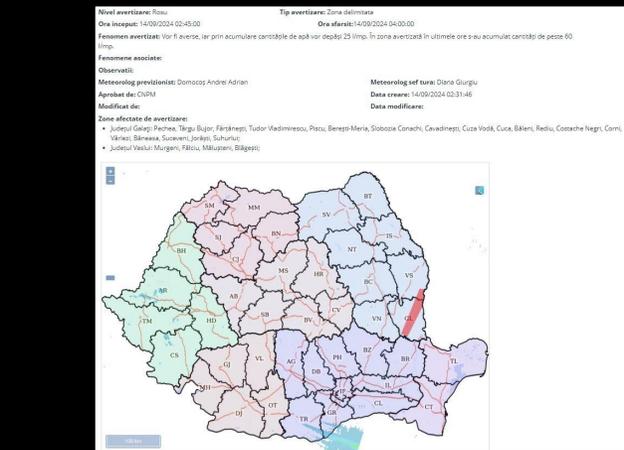


3h accumulated precipitations



Maximum radial velocity + divergence

Maximum reflectivity + convergence



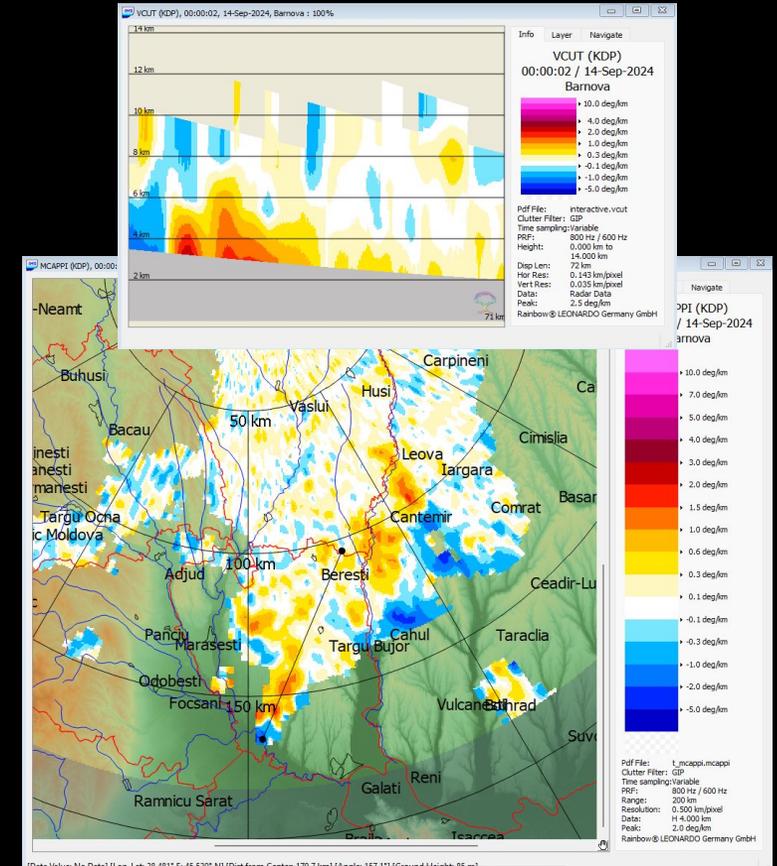
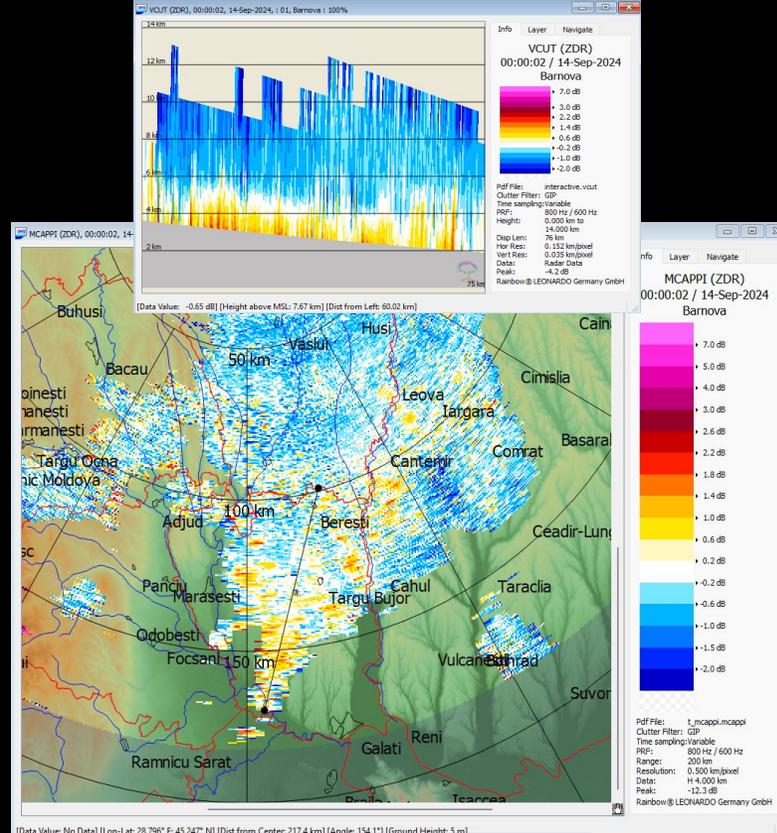
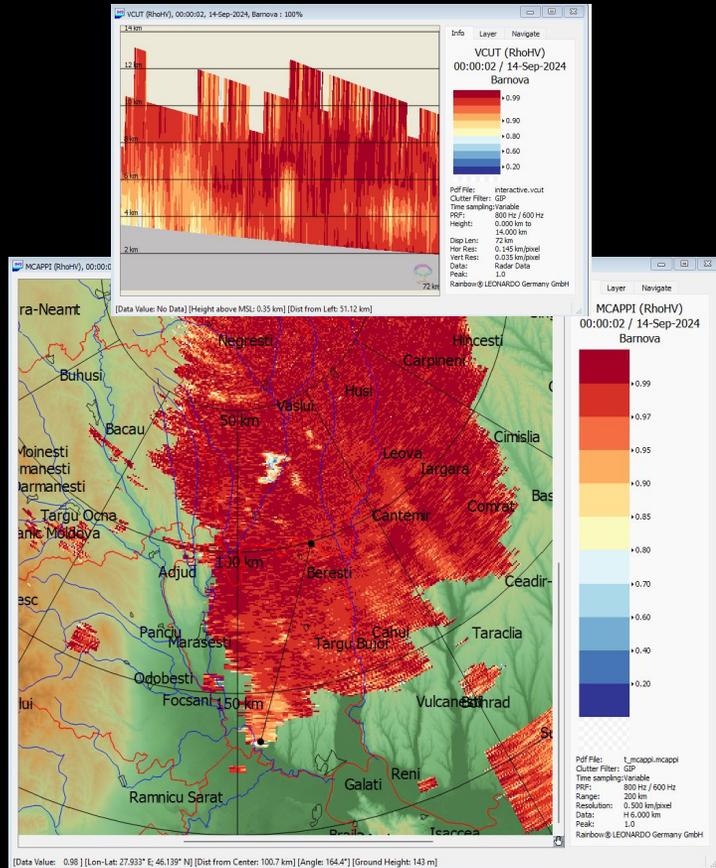
Cross-correlation coefficient (RhoHV)

- measure of the variability of scattering properties

Differential reflectivity ZDR (dB)

- The difference between horizontal and vertical reflectivity

Specific differential overruon KDP (grad/km)



Typical Values (Hail)

| | Classic | Melting | Large ($D \geq 2"$) |
|------------|-------------|------------|-----------------------|
| Z | > 55 dBZ | > 60 dBZ | 40 – 80 dBZ |
| ZDR | 0 – 1 dB | > 1 dB | -0.5 – 1 dB |
| CC | 0.95 – 0.97 | ~ 0.95 | < 0.9 |
| KDP | ~ 0 deg/km | > 3 deg/km | N/A |

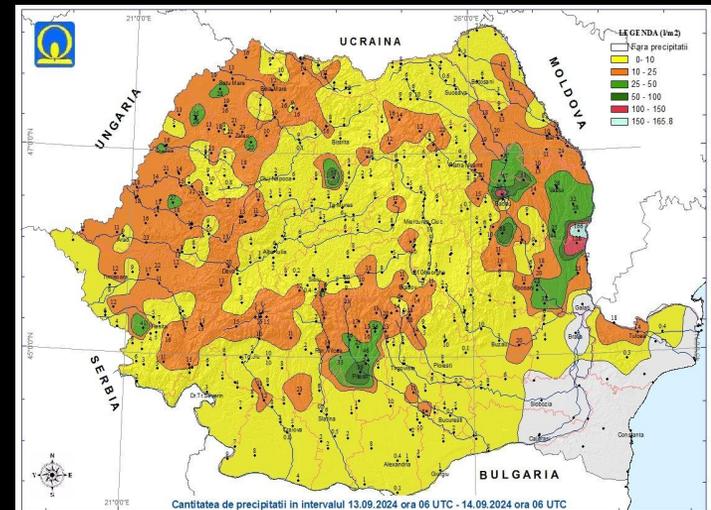
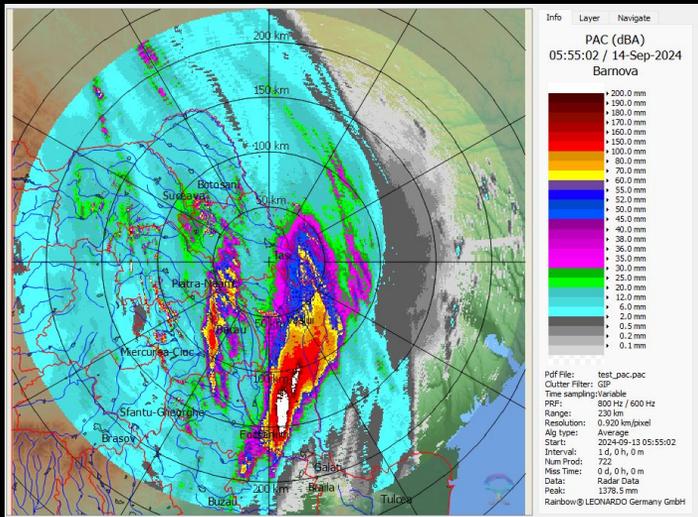
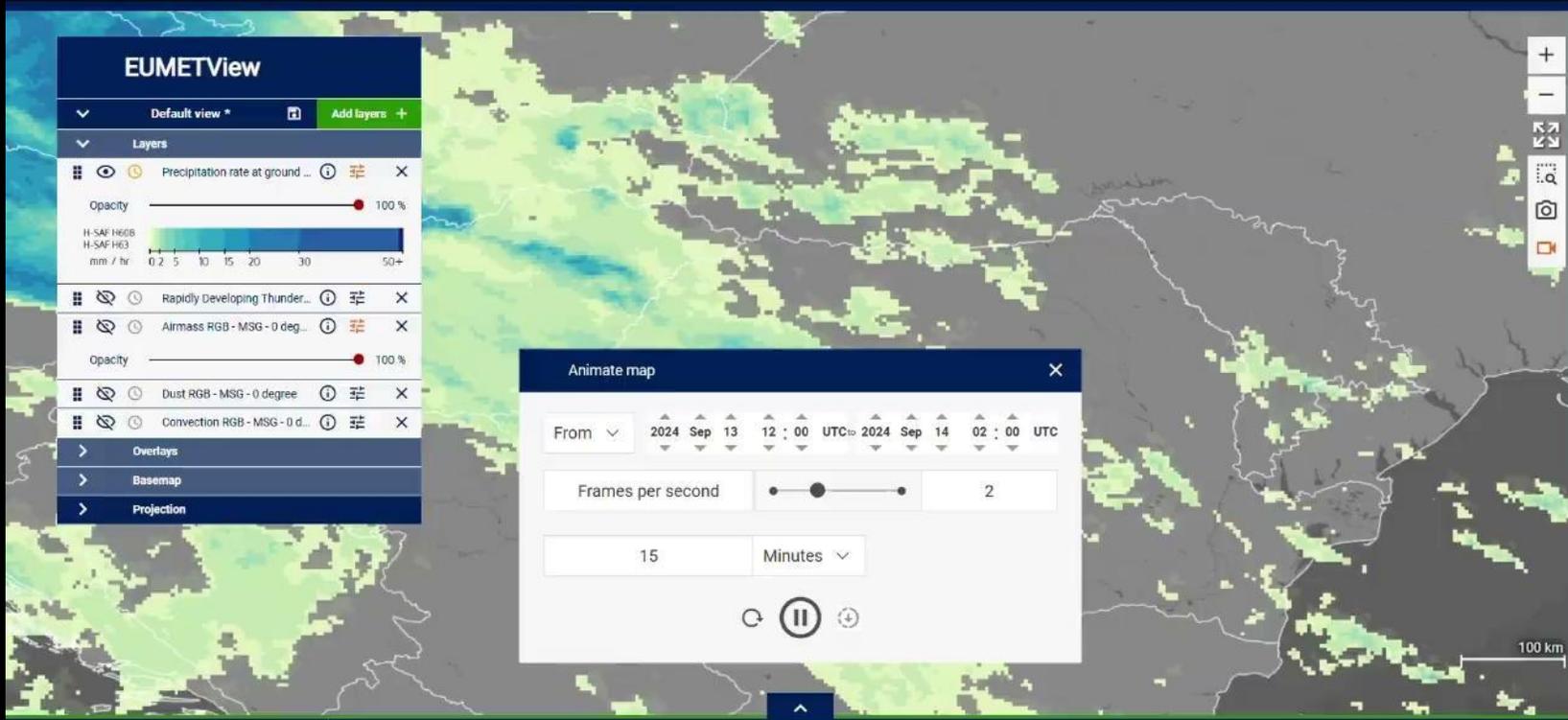
Differential Reflectivity - ZDR

- Definition:
 - Difference between horizontal and vertical reflectivity factors = Drop Shape
 - ZDR values for rain typically > 1 to as high as 5 for large drops
 - ZDR values for snow typically less than 0.5 (except for wet or melting snow when it's much higher)
 - ZDR for hail generally between -1 and +1 (larger values for melting)

| Range of Values | Units | Abbreviations |
|-----------------|---------------|-----------------|
| -7.9 to 7.9 | decibels (dB) | ZDR or Z_{DR} |

Specific Differential Phase KDP

- Range derivative of the differential phase shift along a radial
- Non meteorological echoes aren't shown
- Similar to ZDR
- Particle Concentration
- Used for:
 - Heavy Rain
 - Heavy Rain mixed with hail
 - Cold vs. Warm Rain





ESSL
Weather Data Displayer
Powered by the European Weather Cloud

Date & Time (UTC) ?
202409140000

Model runs ?
Model parameters ?

18:00 Fri 13 Sep 2024

Flash area (red) 13 Sep 18:00 ✕
Air Mass RGB 13 Sep 18:00 ✕

km²

- 3
- 6
- 9
- 12
- 15
- 18
- 21

Region: **EURO** Display Mode ?
 Forecast Verification Nowcast Analysis

IASI hyperspectral sounder:



Surface observations ▾

Storm reports ▾

MTG FCI ▲

| | | |
|-----------------|-------------------------|-----------------------|
| VIS 0.4 | VIS 0.5 | VIS 0.5 HR (500m) |
| VIS 0.8 | VIS 0.9 | NIR 1.3 |
| NIR 1.6 | NIR 2.2 HR (500m) | IR 3.9 FBI (1km) |
| WV 6.3 | WV 7.3 | IR 8.7 |
| IR 9.7 | IR 10.5 HR (1km) | IR 12.3 |
| IR 13.3 | IRW Clouds RGB | Air Mass RGB |
| Convection RGB | Dust RGB | Green Snow RGB |
| Light Fog RGB | True Color RGB | True Color Raw RGB |
| Cloud Phase RGB | Cloud Type RGB | Sandwich |
| Enhanced IR | Total Moisture w/o mask | Total Moisture masked |

SEVIRI ▾

Radar Products ▾

MTG LI - Initial Products ▾
Flash area (red)

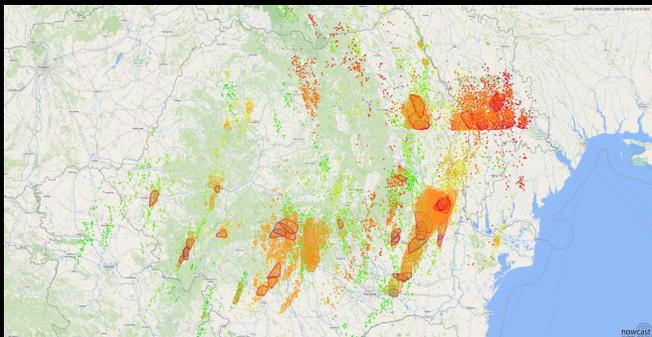
GLD Lightning ▾

Nowcasting SAF EWC ▾

Product Evaluation ▾

Forecast Verification ▾

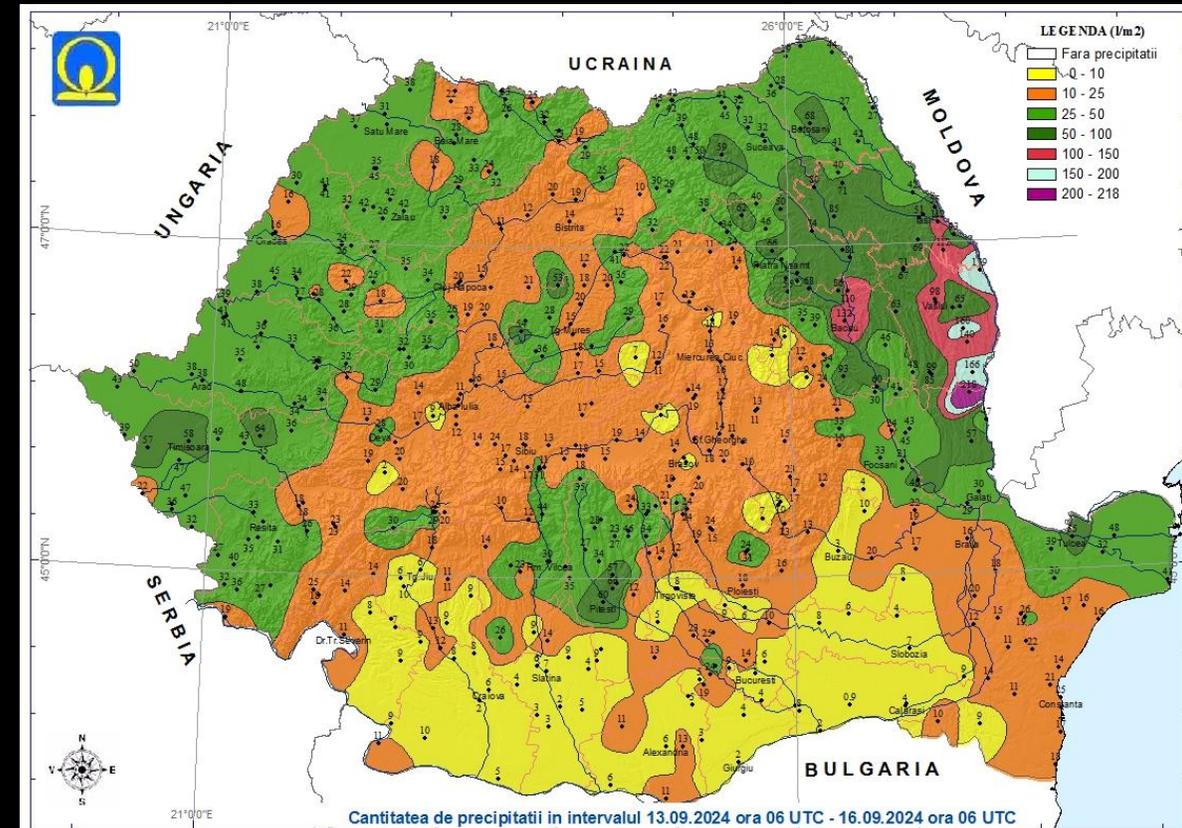
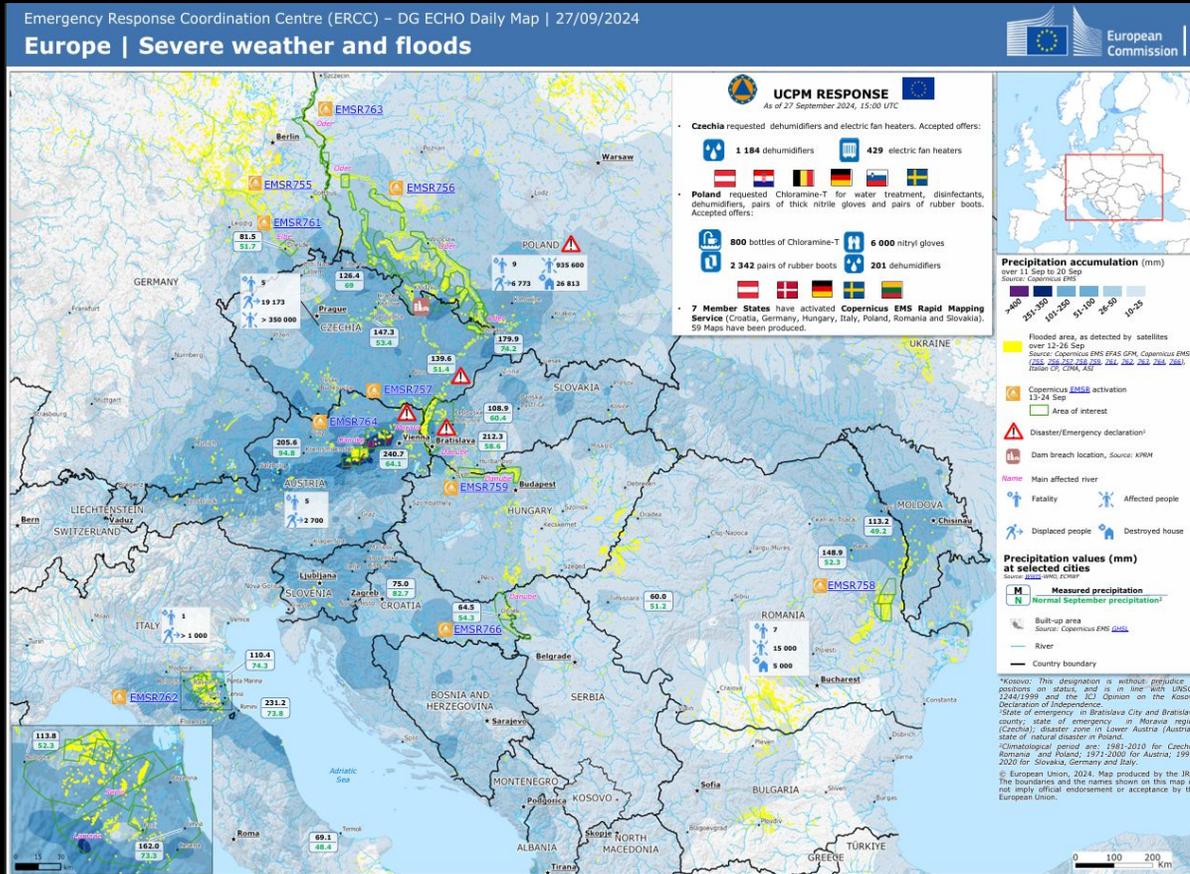
Forecast: Short/medium-range ▾



LINET view – Lightning
Detection Visualisation

Conclusions

- Floods in Romania were caused by the existence of a cyclone which evolved in the central-east part of Europe and fueled continuously from the Black Sea surface.
- the retrograde development of this cyclone was caused by a blockage in the atmospheric pressure field, both from eastern and central-western part of the continent
- precipitation bands who followed the next days had caused a “train effect”, causing important floods in eastern Romania.



Bibliography

- <https://european-flood.emergency.copernicus.eu/en/news/flooding-caused-storm-boris-central-and-eastern-europe-september-2024>
- <https://meteologix.com/ro>
- https://www.meteoromania.ro/clim/caracterizare-lunara/cc_2024_09.html
- <https://www.dwd.de/>
- <https://eumetrain.org/eport>
- <https://lukemweather.blogspot.com/2011/01/jet-streak-dynamics-i-four-quadrant.html>
- www4.ncsu.edu, (Kocin and Uccellini, 1990).
- <https://intranet.meteo.local/alaro/index.php>
- <https://www.estofex.org/>
- <https://www.meteoromania.ro/>
- Ab Maas, Introduction Conceptual Models Sat(rep)Manu(al)
- <https://www.essl.org/cms/essl-testbed/>
- IBL Visual Weather
- https://www.weather.gov/media/lmk/soo/OG_Theory_Review.pdf
- <https://www.digi24.ro/stiri/actualitate/evenimente/cisu-galati-a-decis-evacuarea-oamenilor-din-zonele-cu-potential-de-risc-de-inundatii-2947909>
- <https://romania.europalibera.org/a/comune-iudetul-galati-inundatii-programe-investitii-guvern/33126493.html>

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