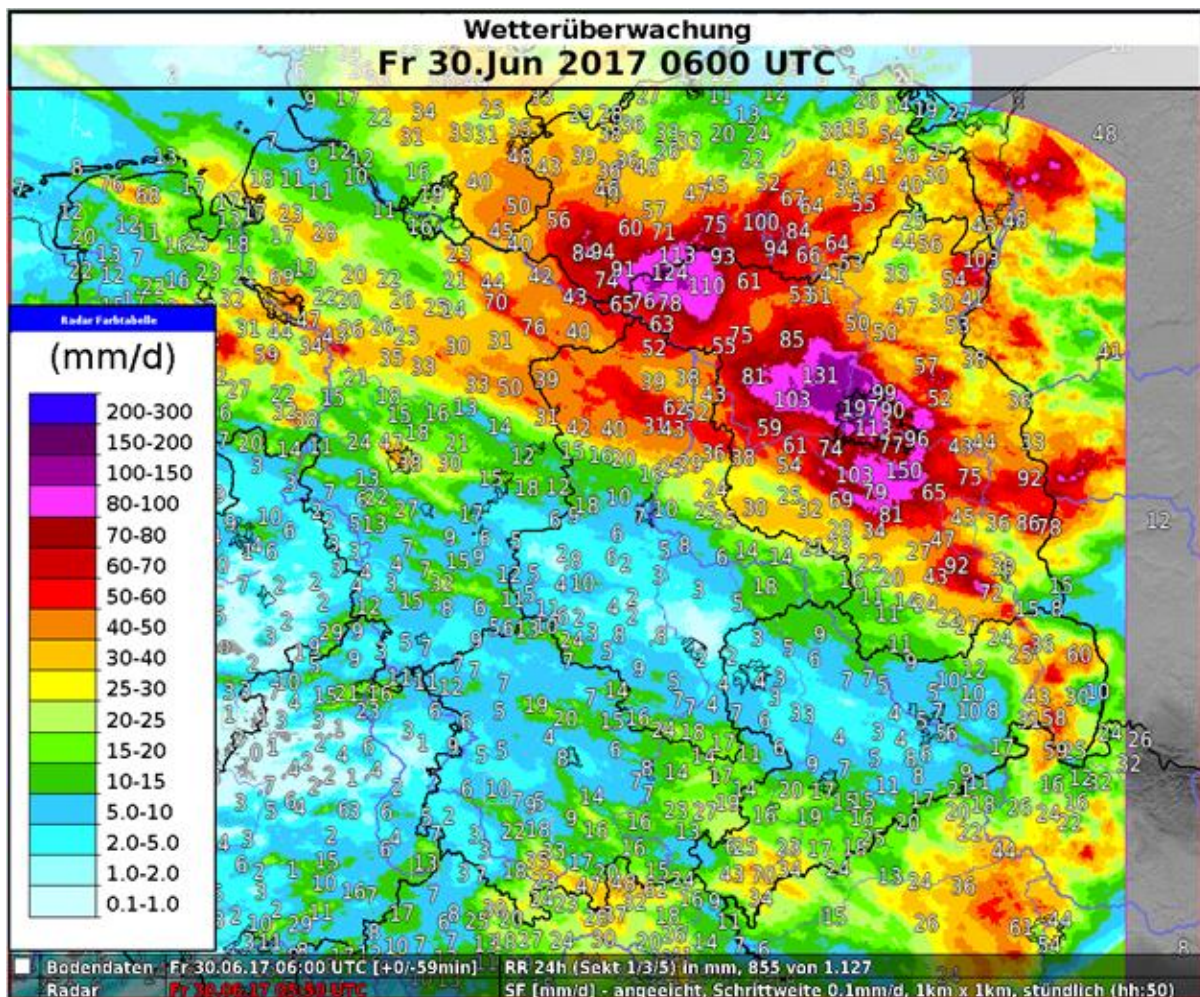


20170630 - Heavy Rain over NE part of Germany, especially in the greater Berlin area

1. Impact

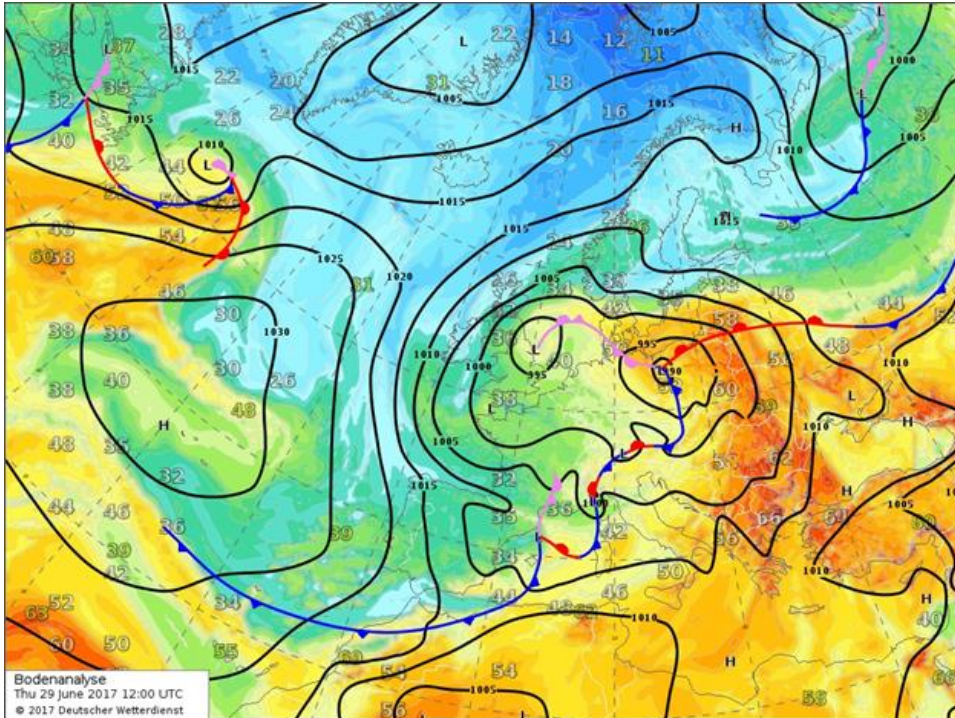


Heavy rain (up to approx. 200 mm / 24) caused widespread flooding in urban and rural areas around Berlin. Pictures: Bernd Maerz and BernauLive



24 hr accumulated precip, 29 June – 30 June, 06 UTC. Observations from station network and radar measurements

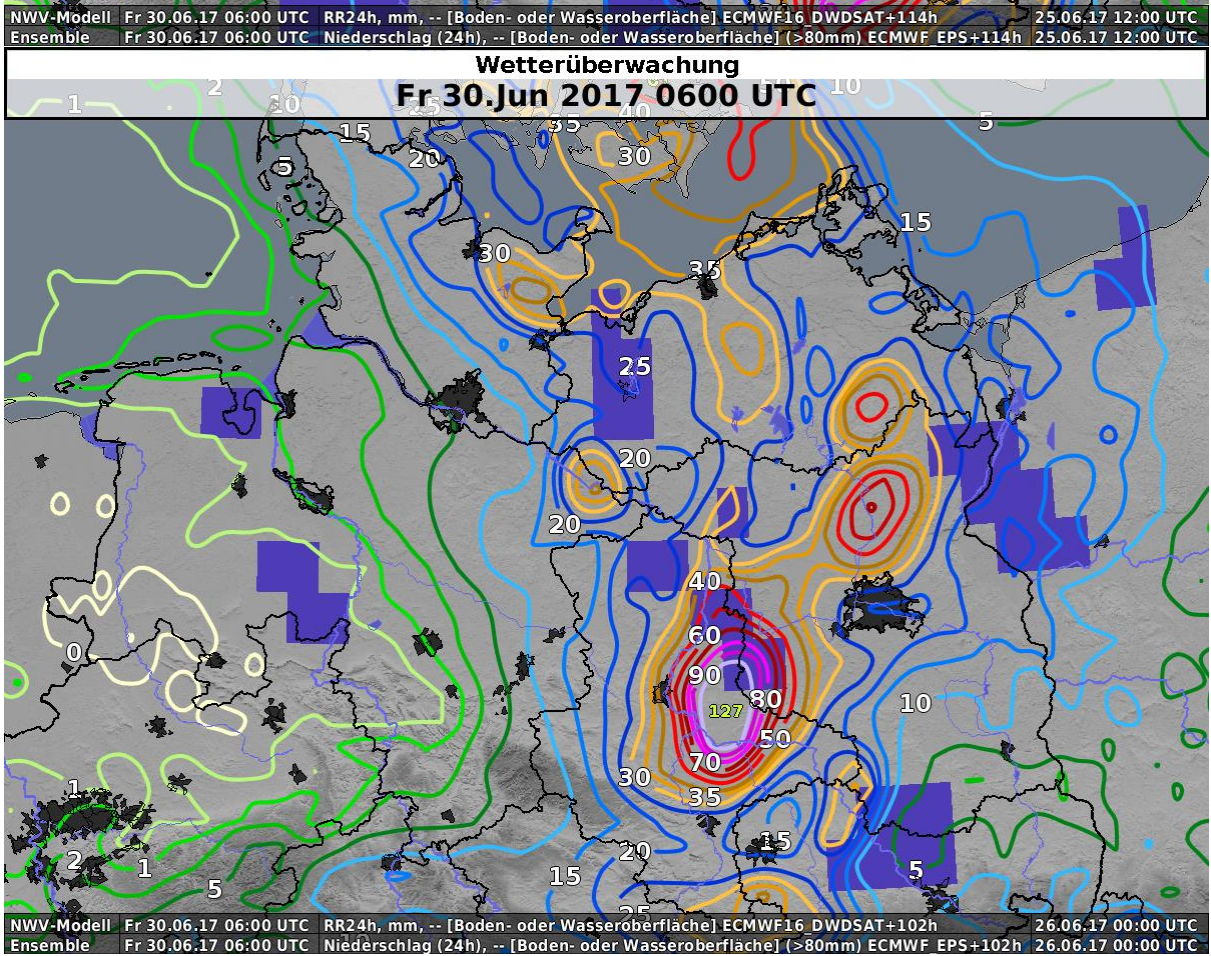
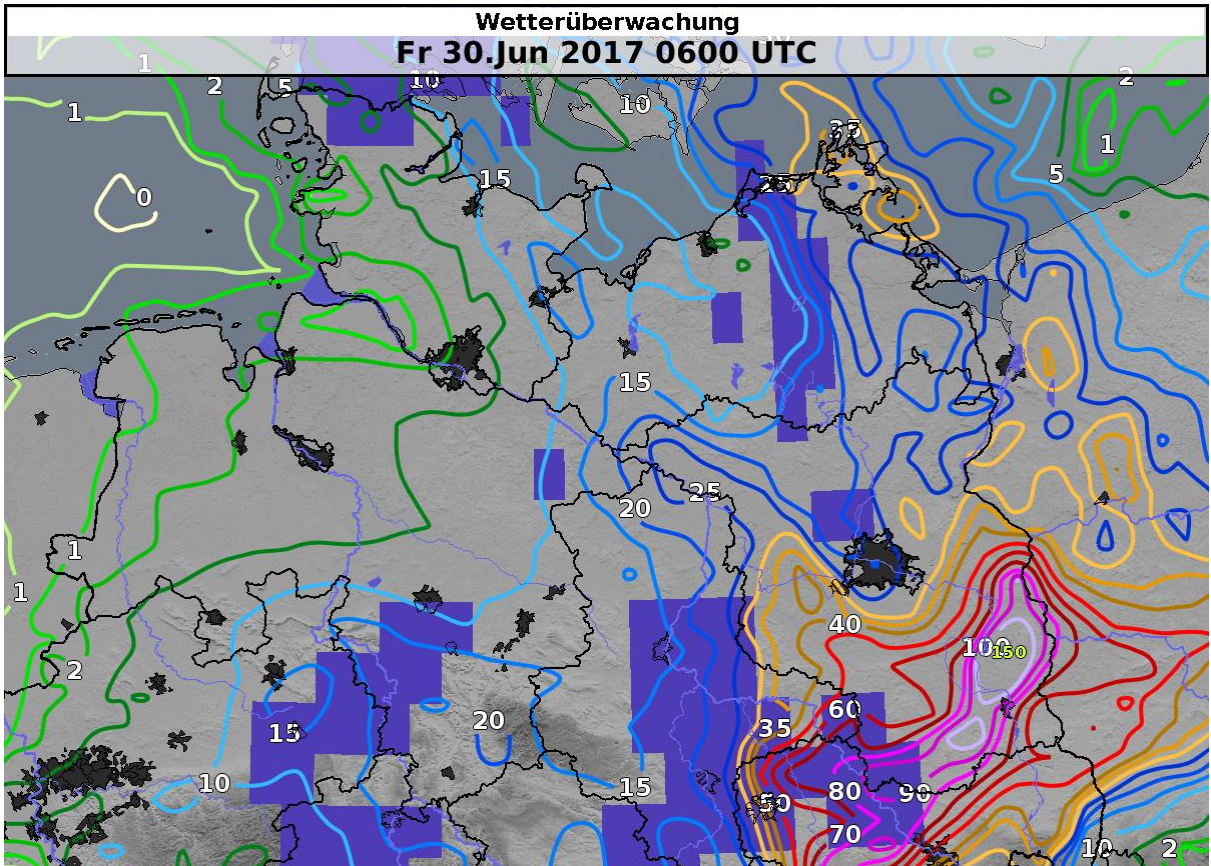
2. Description of the event

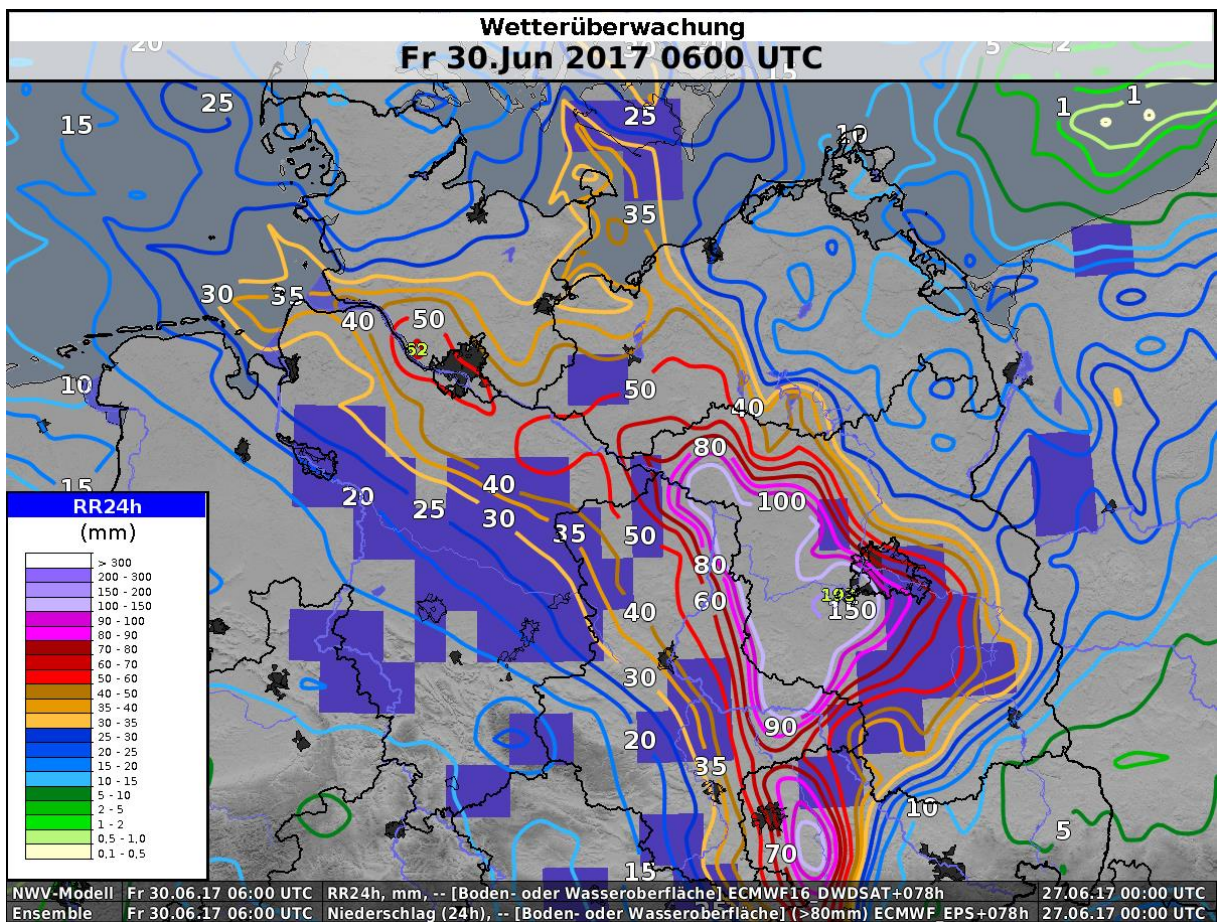
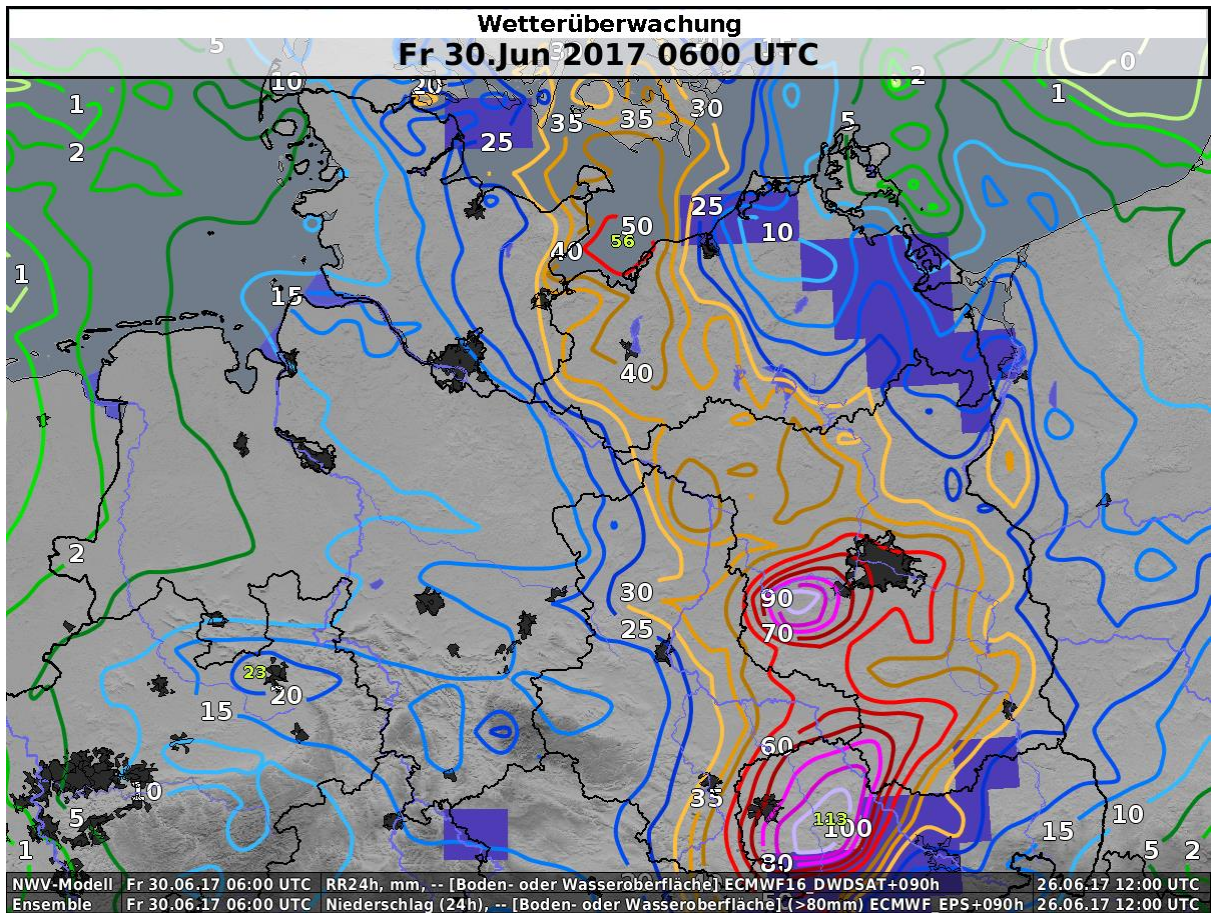


On the east flank of a mid-tropospheric through a cyclone developed, travelled over Bohemia and western Poland into northerly direction. Strong lifting of a very wet air mass (total water column up to 45 mm) on the northern and western side of the low caused heavy precipitation over NE part of Germany.

3. Data assimilation ?

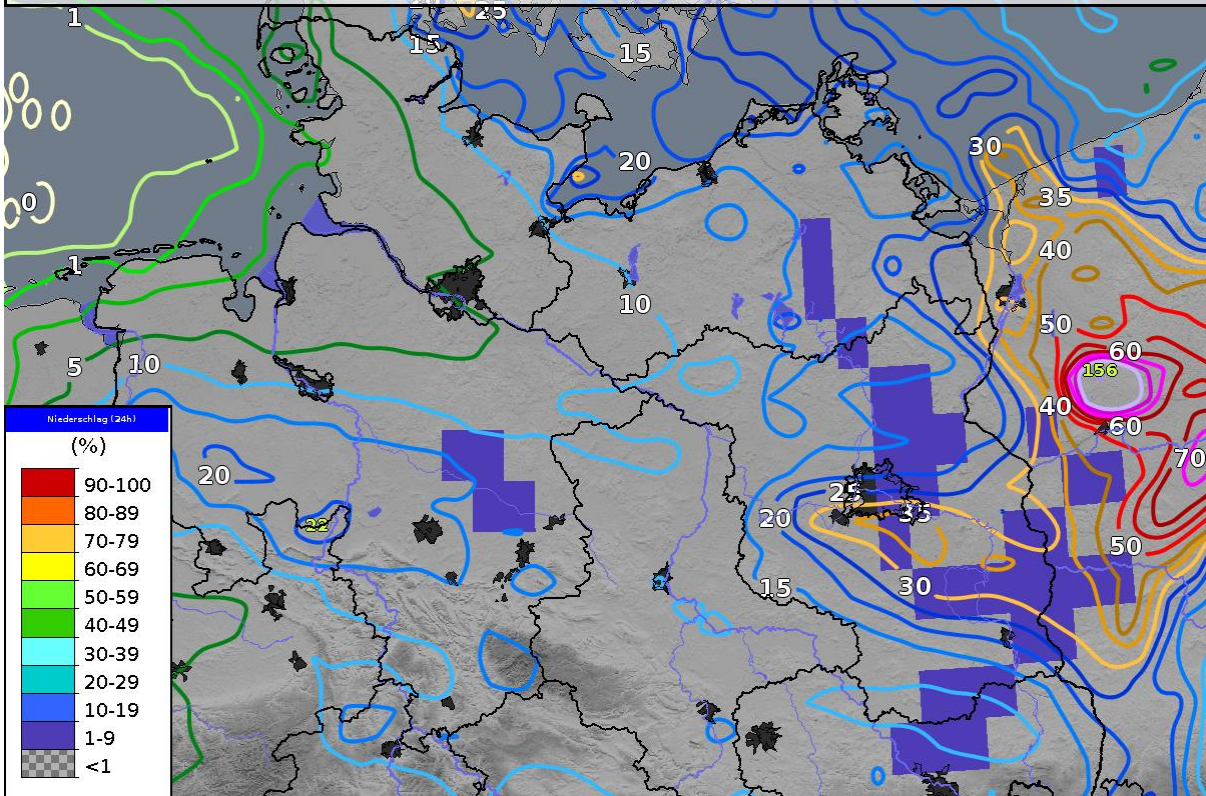
3.1. HRES + ENS





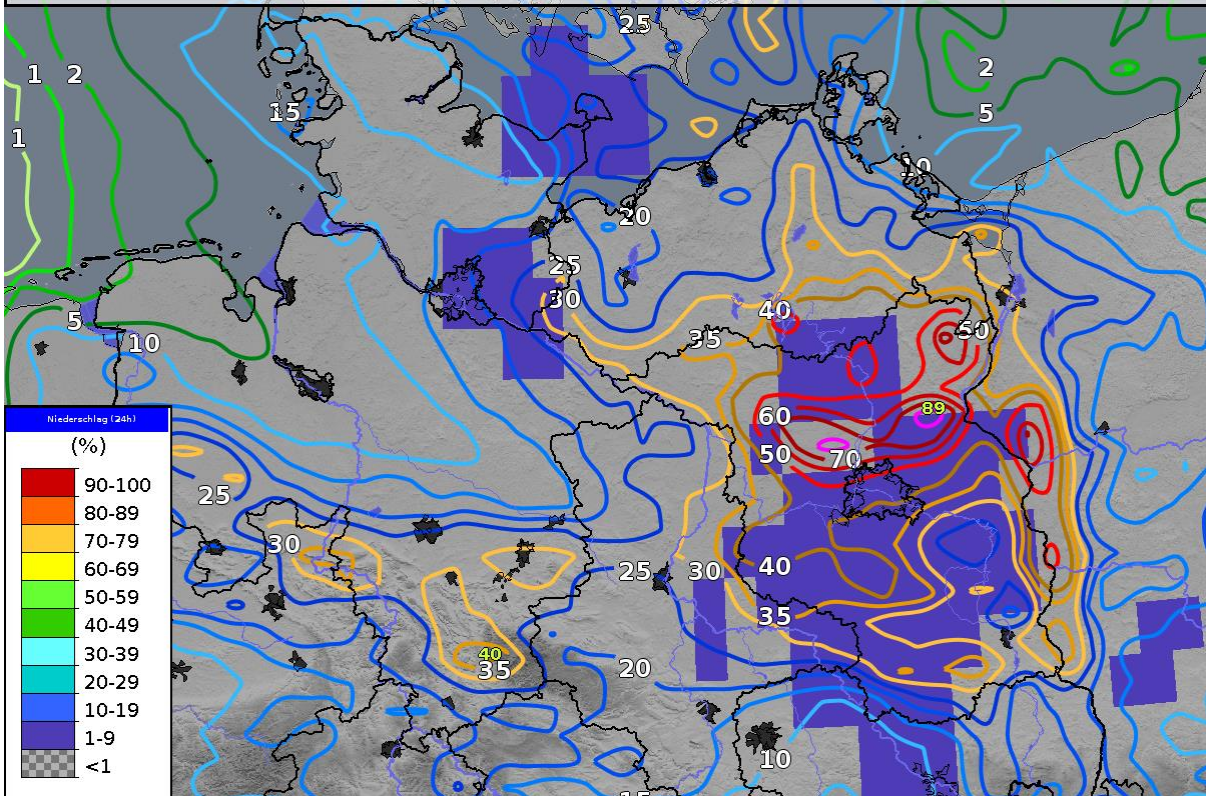
MR forecasts, HRES (isolines), ENS (isoareas, probability of more than 80 mm /24 h). From top to bottom: 25 June, 12 + 114 H, 26 June, 00 + 102 H, 26 June, 12 + 90 H and 27 June, 00 + 78 H

Wetterüberwachung
Fr 30. Jun 2017 0600 UTC



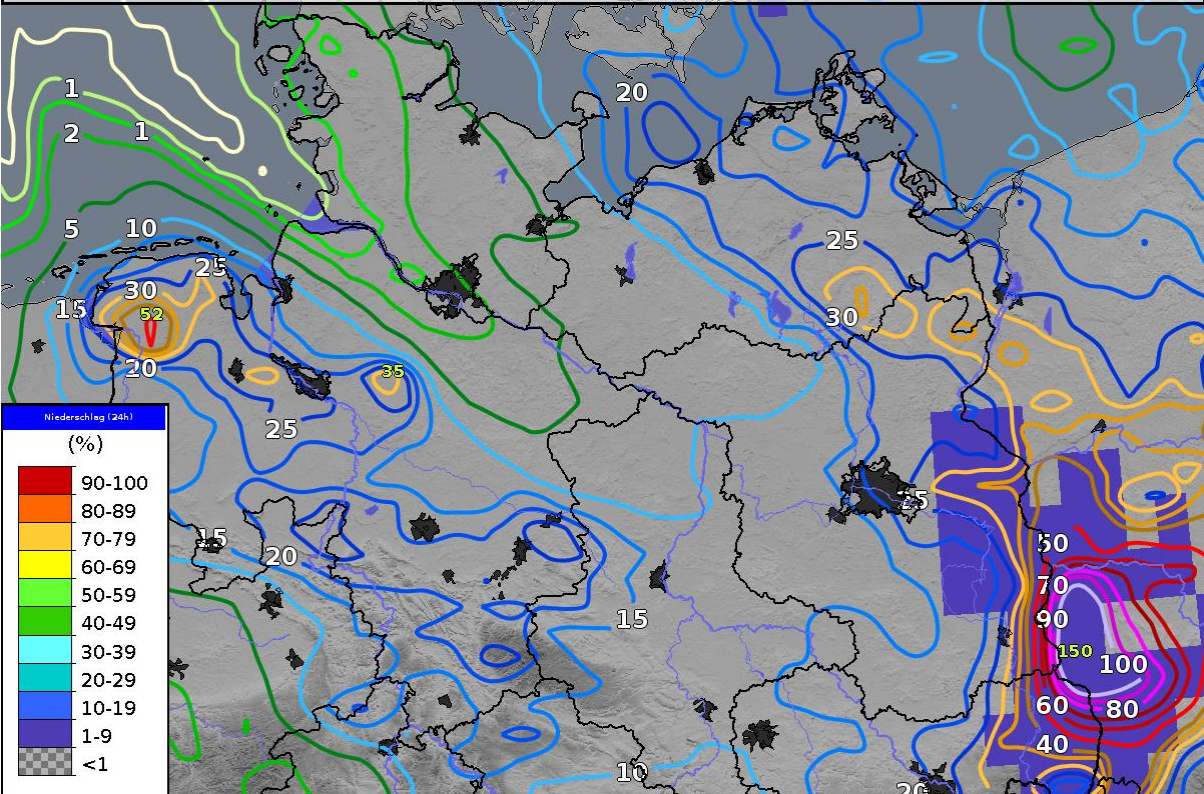
NWV-Modell Fr 30.06.17 06:00 UTC RR24h, mm, -- [Boden- oder Wasseroberfläche] ECMWF16_DWDSAT+066h 27.06.17 12:00 UTC
 Ensemble Fr 30.06.17 06:00 UTC Niederschlag (24h), -- [Boden- oder Wasseroberfläche] (>80mm) ECMWF_EPS+066h 27.06.17 12:00 UTC

Wetterüberwachung
Fr 30. Jun 2017 0600 UTC 15



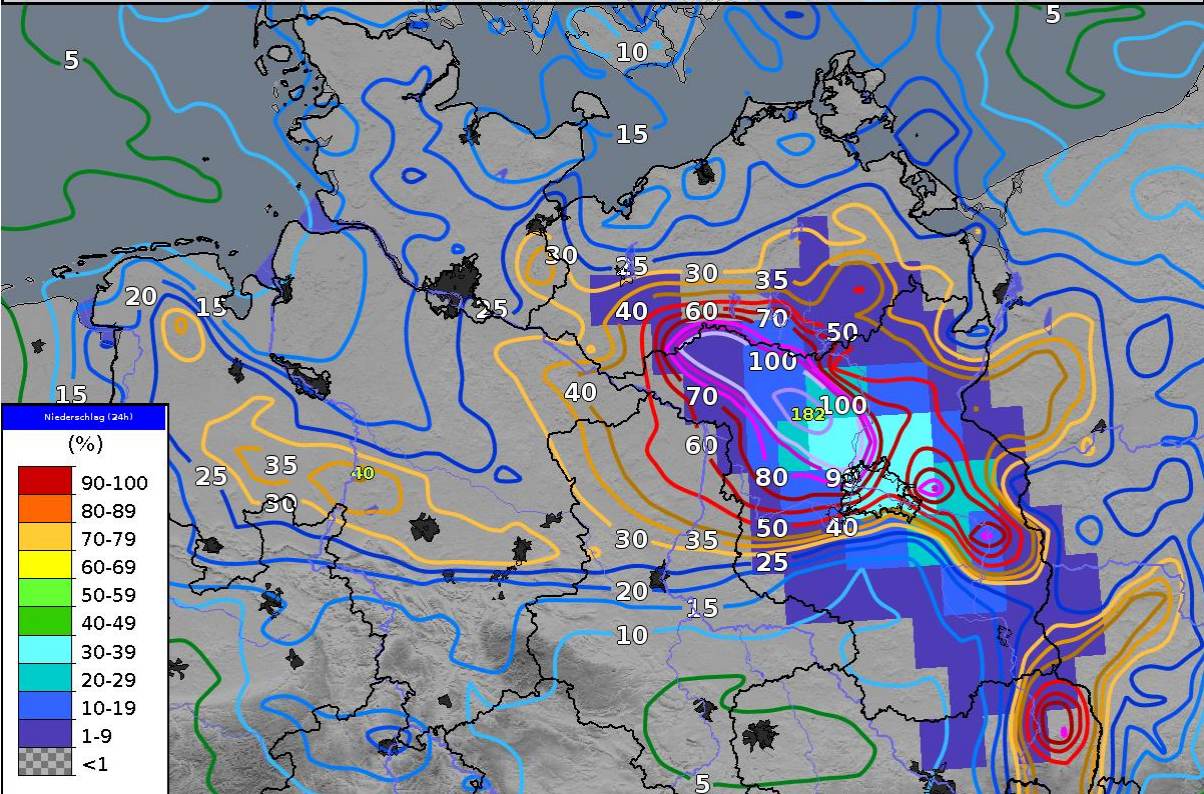
NWV-Modell Fr 30.06.17 06:00 UTC RR24h, mm, -- [Boden- oder Wasseroberfläche] ECMWF16_DWDSAT+054h 28.06.17 00:00 UTC
 Ensemble Fr 30.06.17 06:00 UTC Niederschlag (24h), -- [Boden- oder Wasseroberfläche] (>80mm) ECMWF_EPS+054h 28.06.17 00:00 UTC

Wetterüberwachung
Fr 30. Jun 2017 0600 UTC



NWV-Modell Fr 30.06.17 06:00 UTC RR24h, mm, -- [Boden- oder Wasseroberfläche] ECMWF16_DWDSAT+042h 28.06.17 12:00 UTC
 Ensemble Fr 30.06.17 06:00 UTC Niederschlag (24h), -- [Boden- oder Wasseroberfläche] (>80mm) ECMWF_EPS+042h 28.06.17 12:00 UTC

Wetterüberwachung
Fr 30. Jun 2017 0600 UTC



NWV-Modell Fr 30.06.17 06:00 UTC RR24h, mm, -- [Boden- oder Wasseroberfläche] ECMWF16_DWDSAT+030h 29.06.17 00:00 UTC
 Ensemble Fr 30.06.17 06:00 UTC Niederschlag (24h), -- [Boden- oder Wasseroberfläche] (>80mm) ECMWF_EPS+030h 29.06.17 00:00 UTC

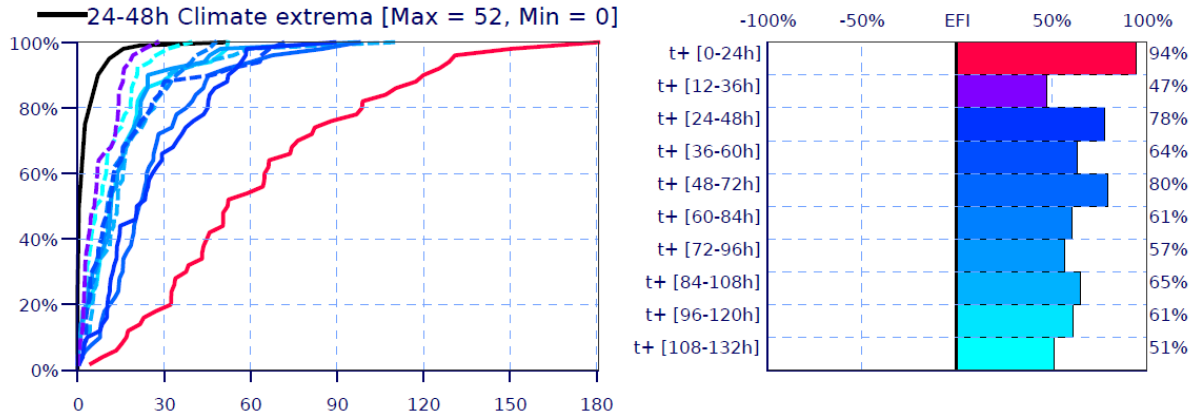
Short range forecasts, HRES (isolines), ENS (isoareas, probability of more than 80 mm /24 h). From top to bottom: 27 June, 12 + 66 H, 28 June, 00 + 54 H, 28 June, 12 + 42 H and 29 June, 00 + 30 H

Forecast and M-Climate cumulative distribution functions with EFI values

52.64°N 13.33°E

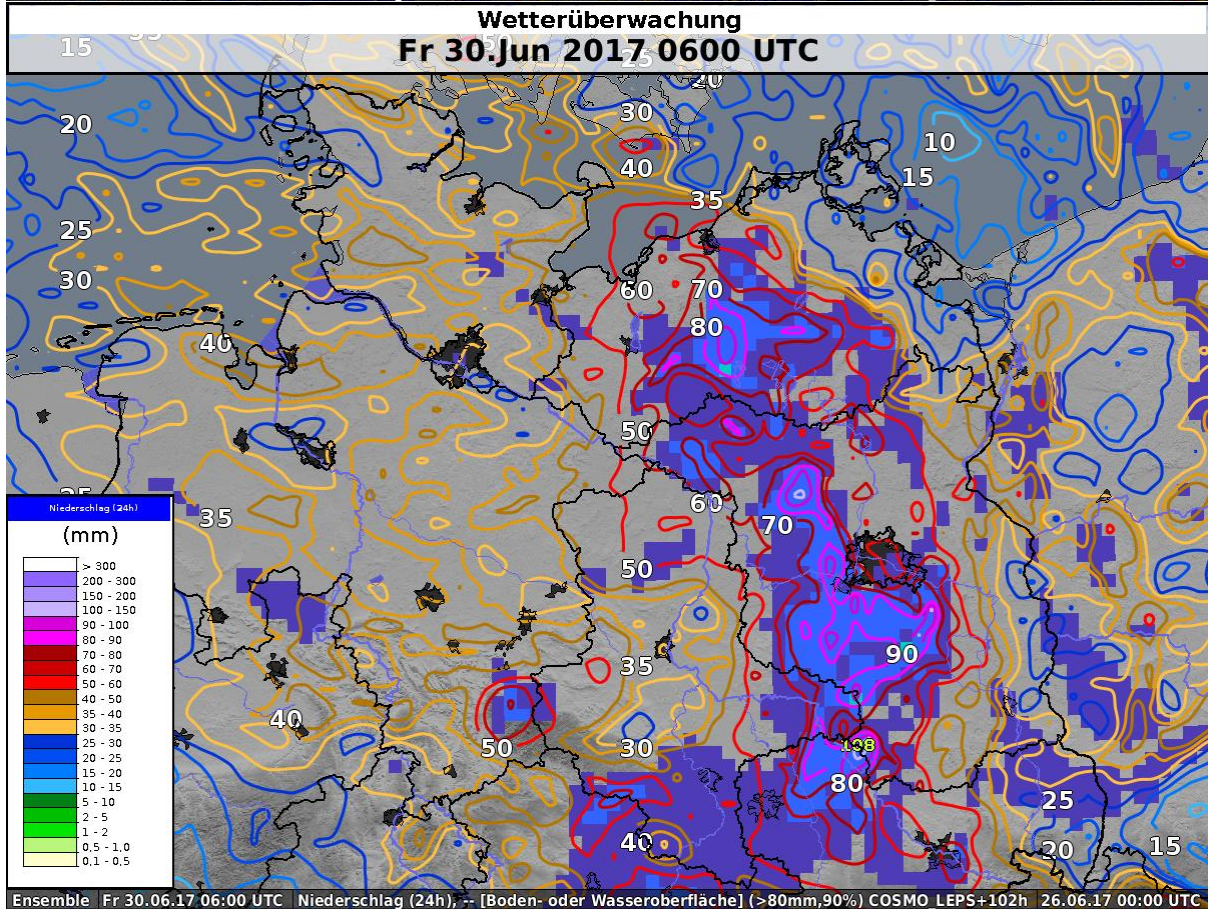
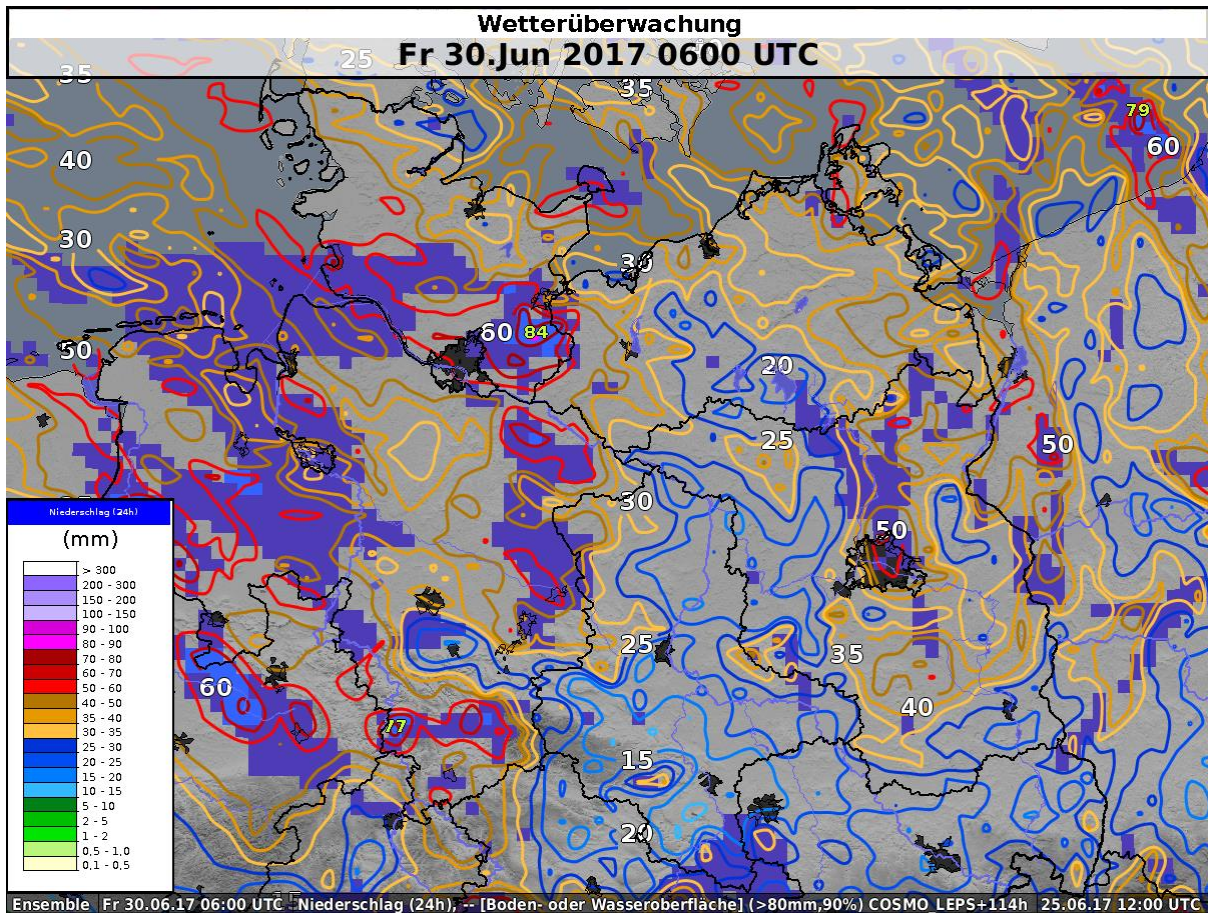
Valid for 24 hours from Thursday 29 June 2017 00 UTC to Friday 30 June 2017 00 UTC

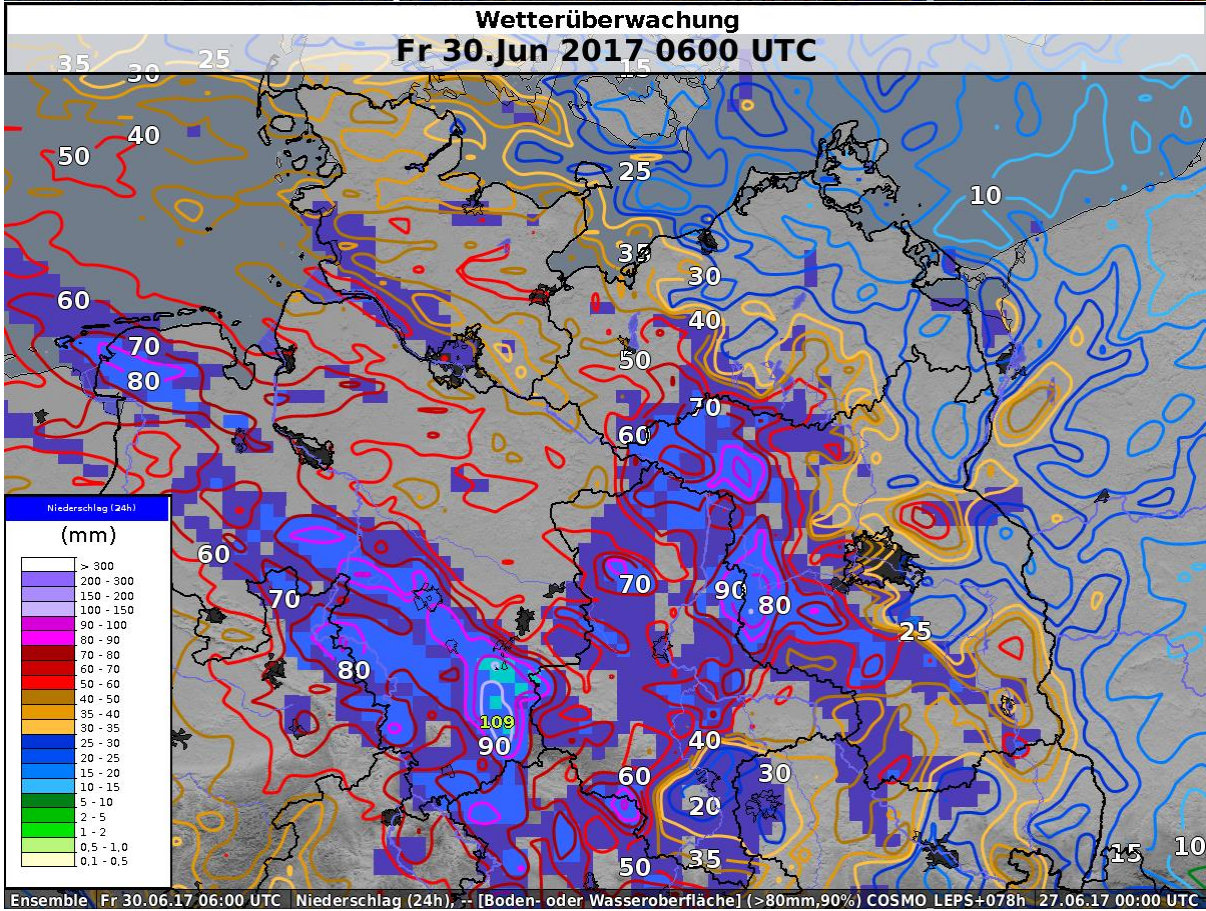
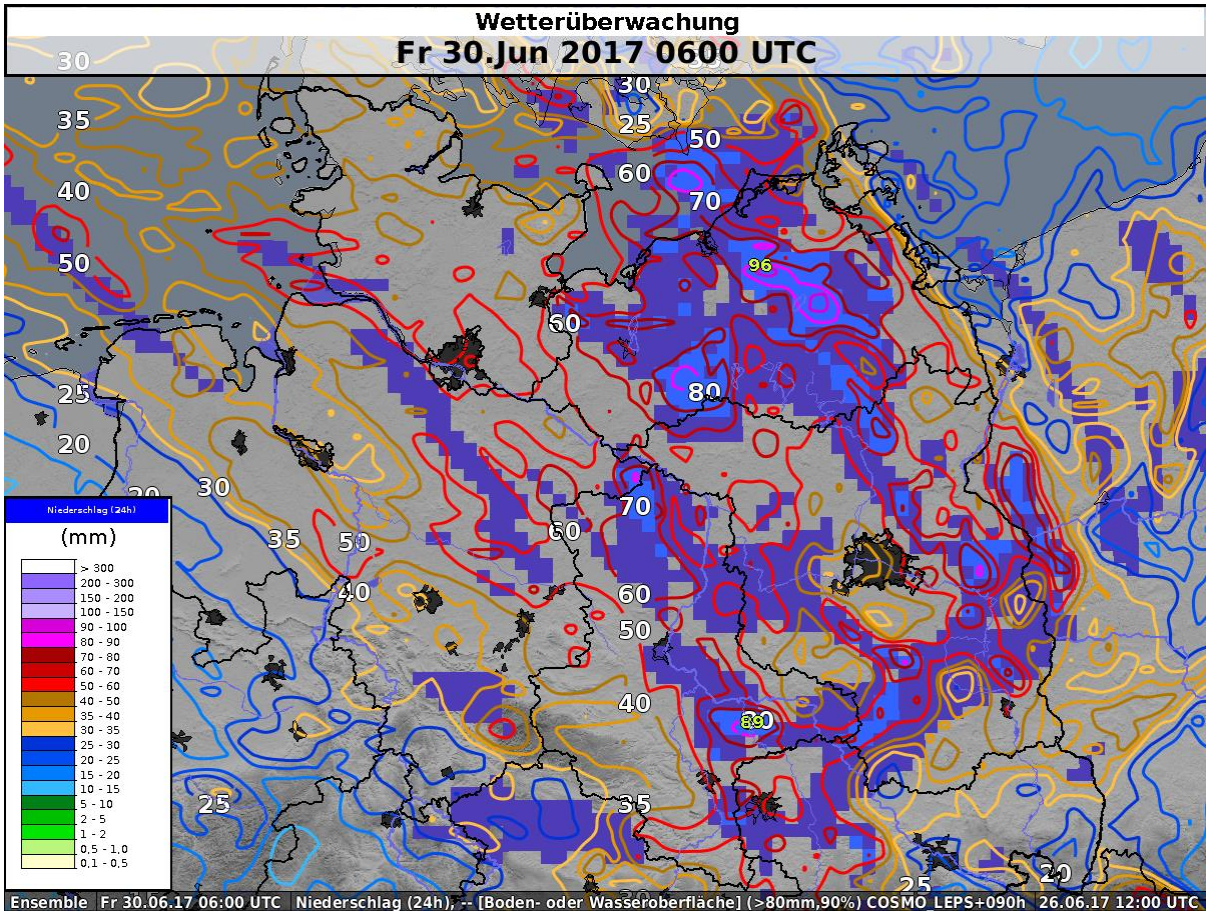
CDF for 24h precipitation (mm)



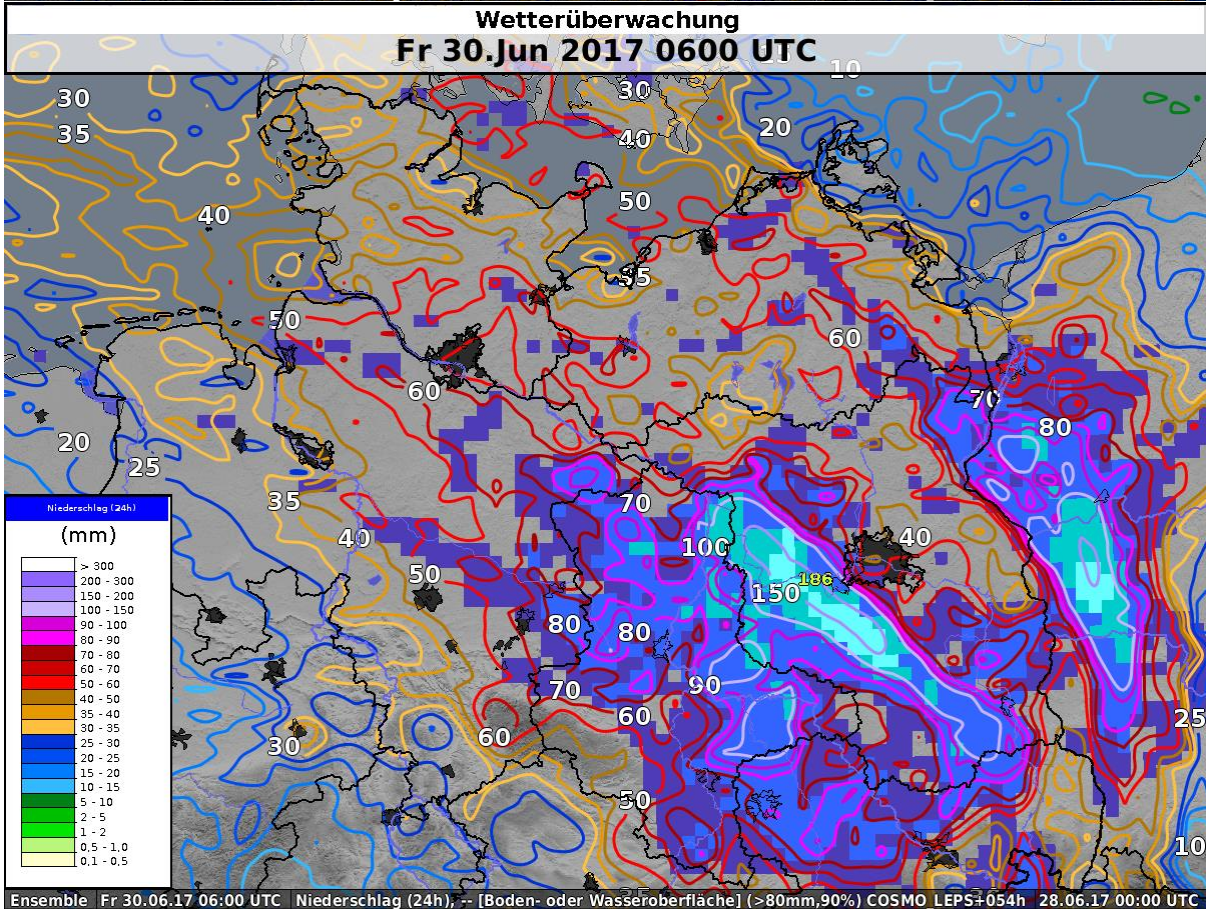
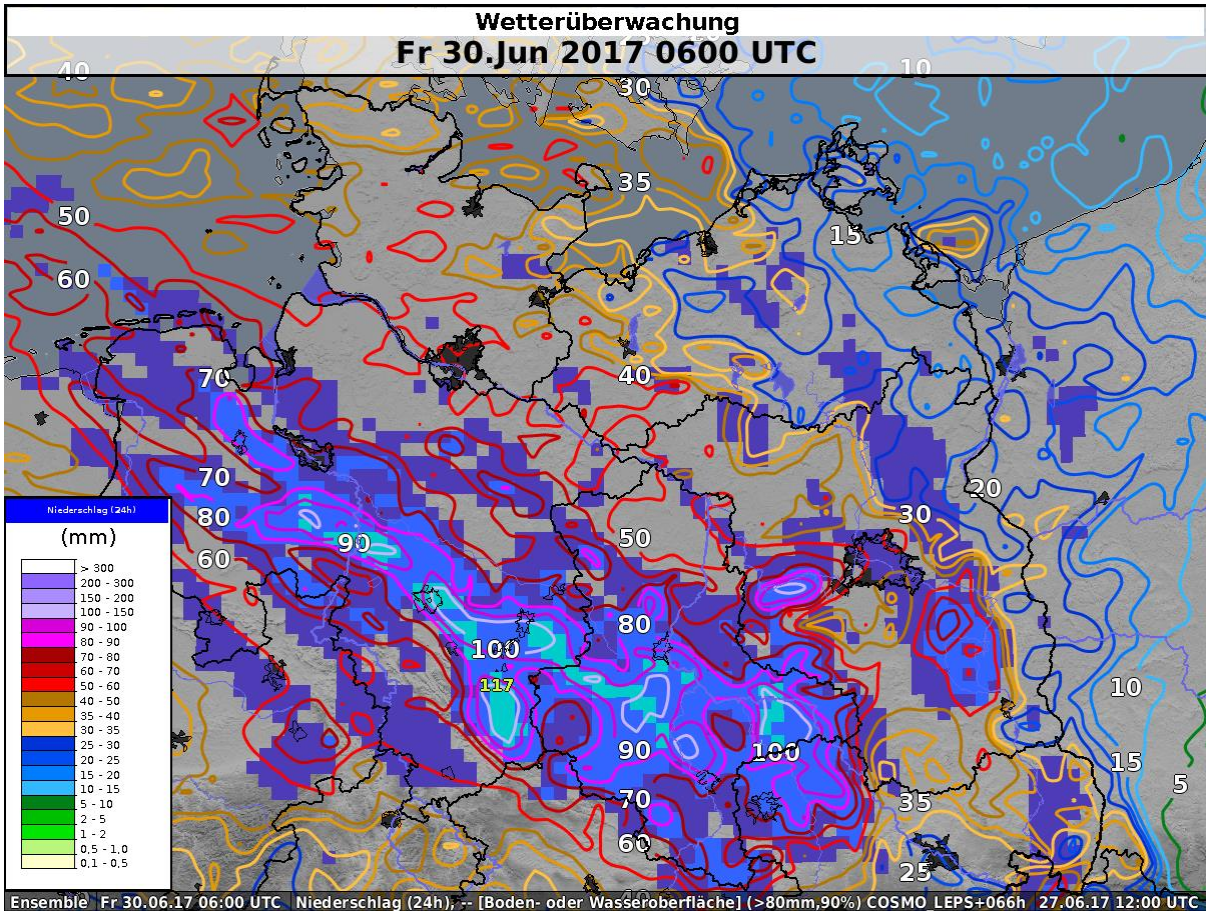
EFI / CDF for Berlin area

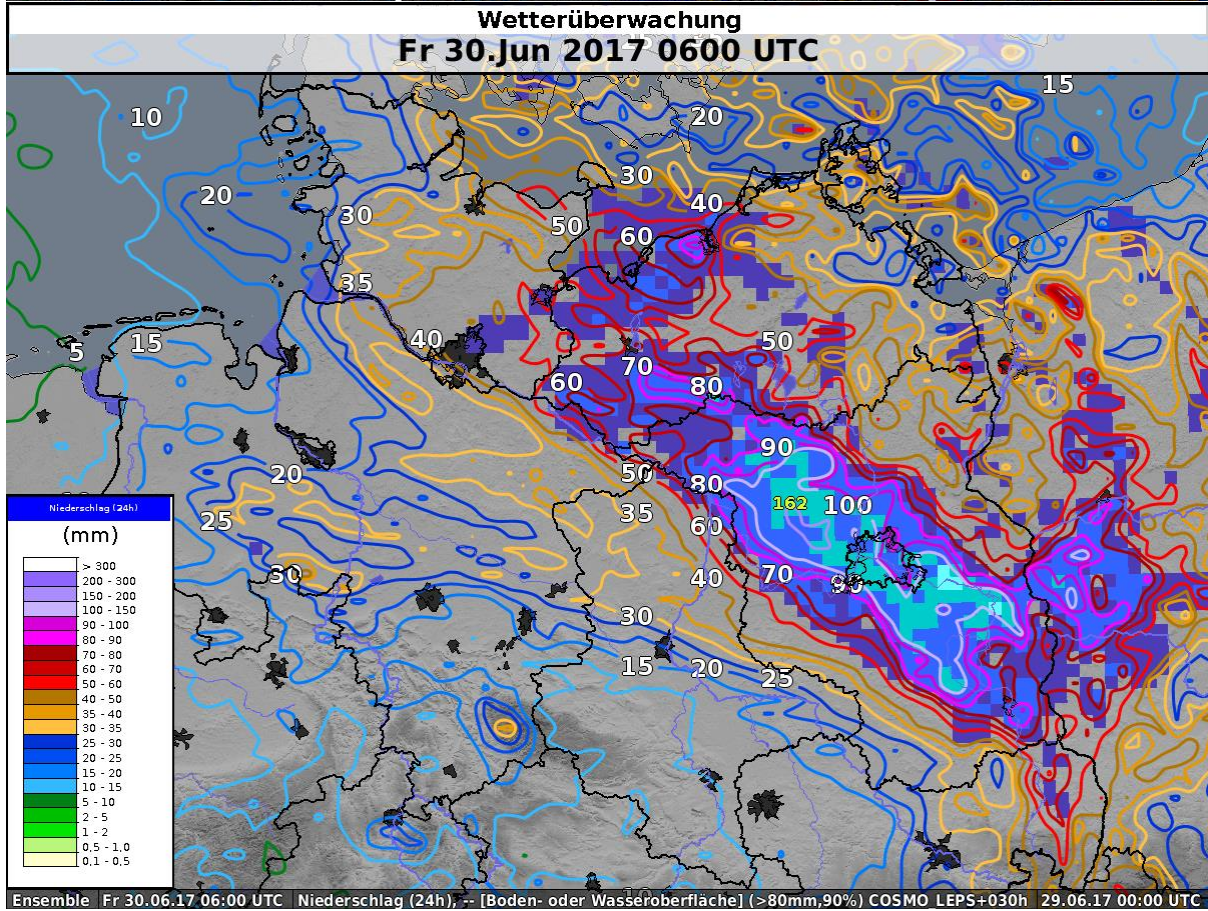
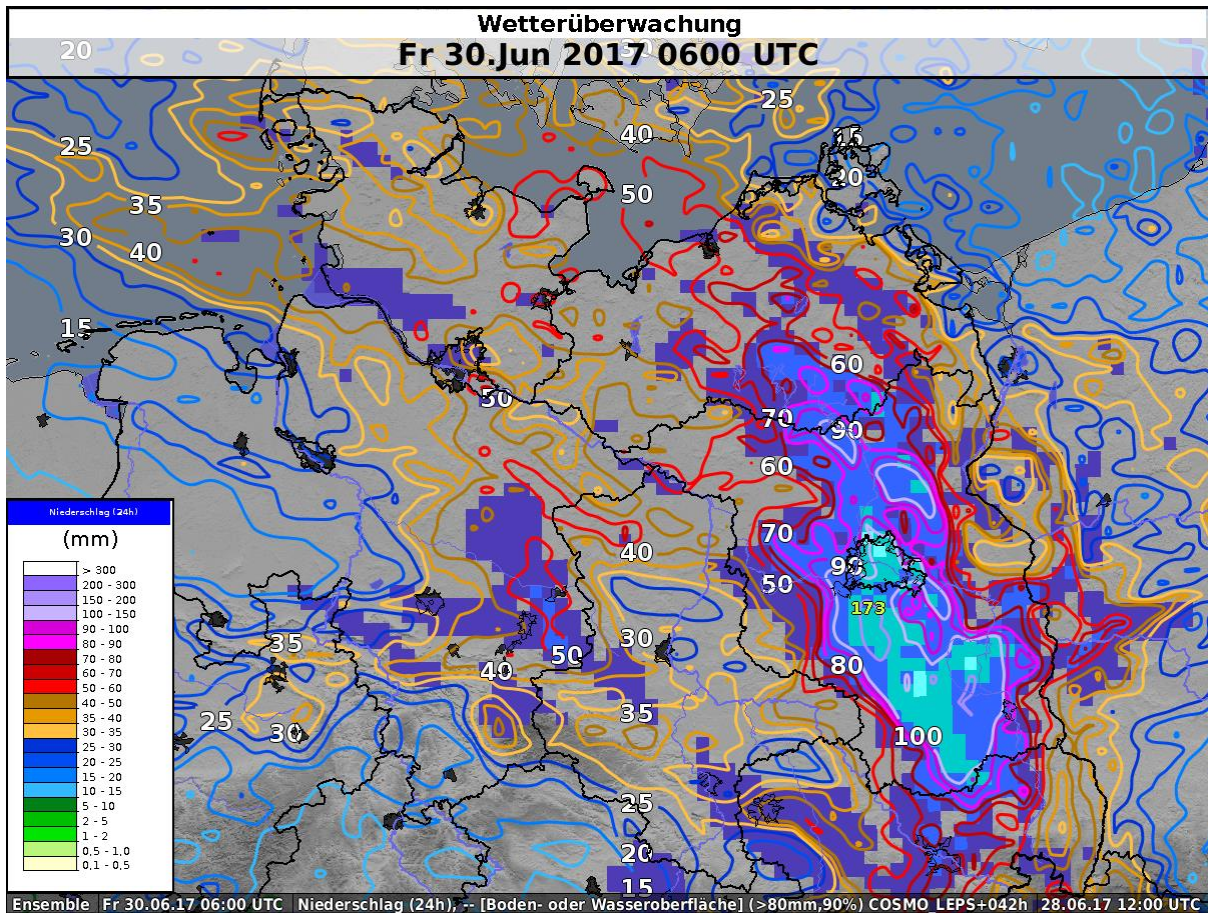
3.2. COSMO-LEPS + comparison with other centers



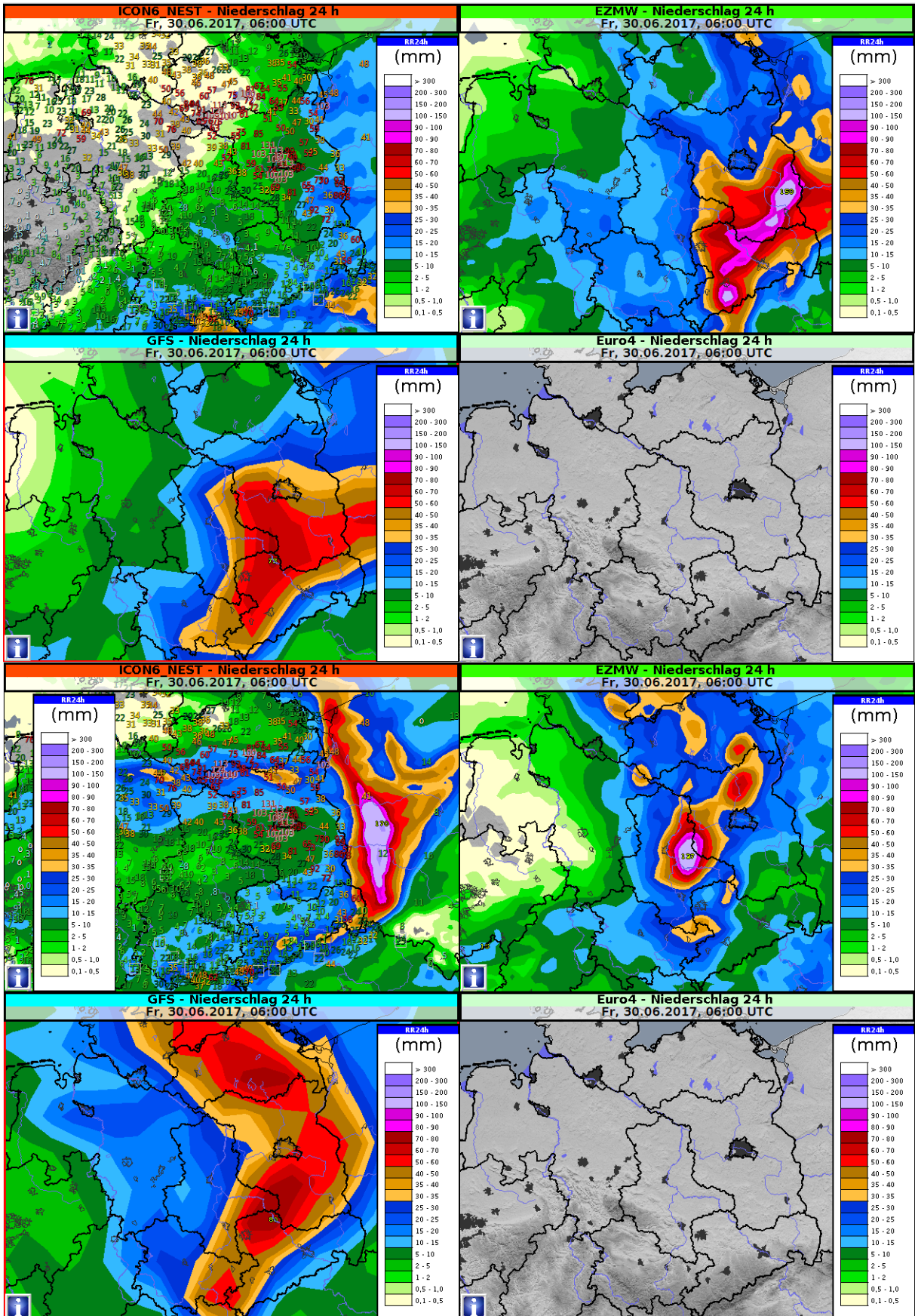


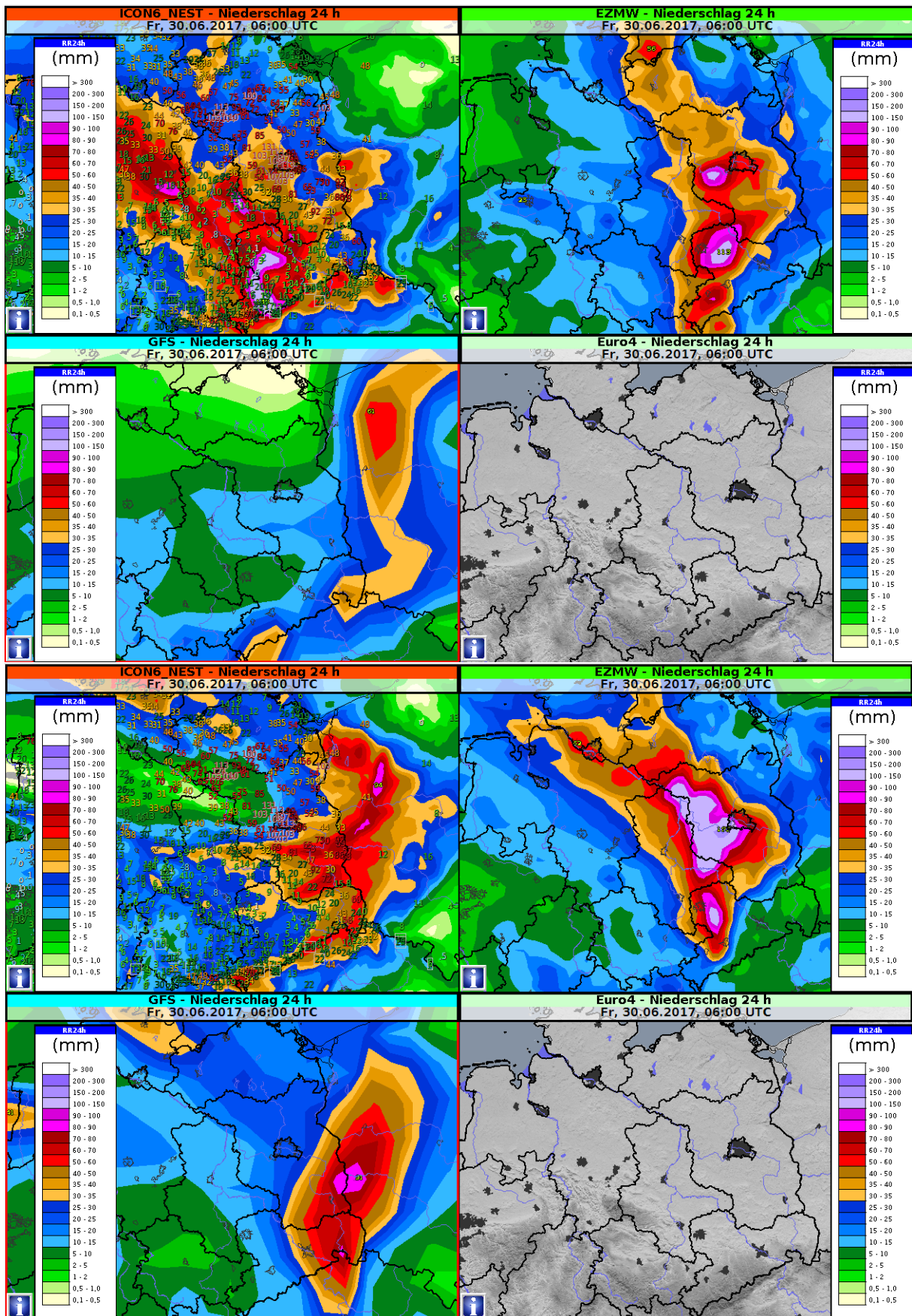
MR forecasts, COSMO-LEPS, Q90 (isolines), probability of more than 80 mm /24 h (isoareas). From top to bottom: 25 June, 12 + 114 H, 26 June, 00 + 102 H, 26 June, 12 + 90 H and 27 June, 00 + 78 H



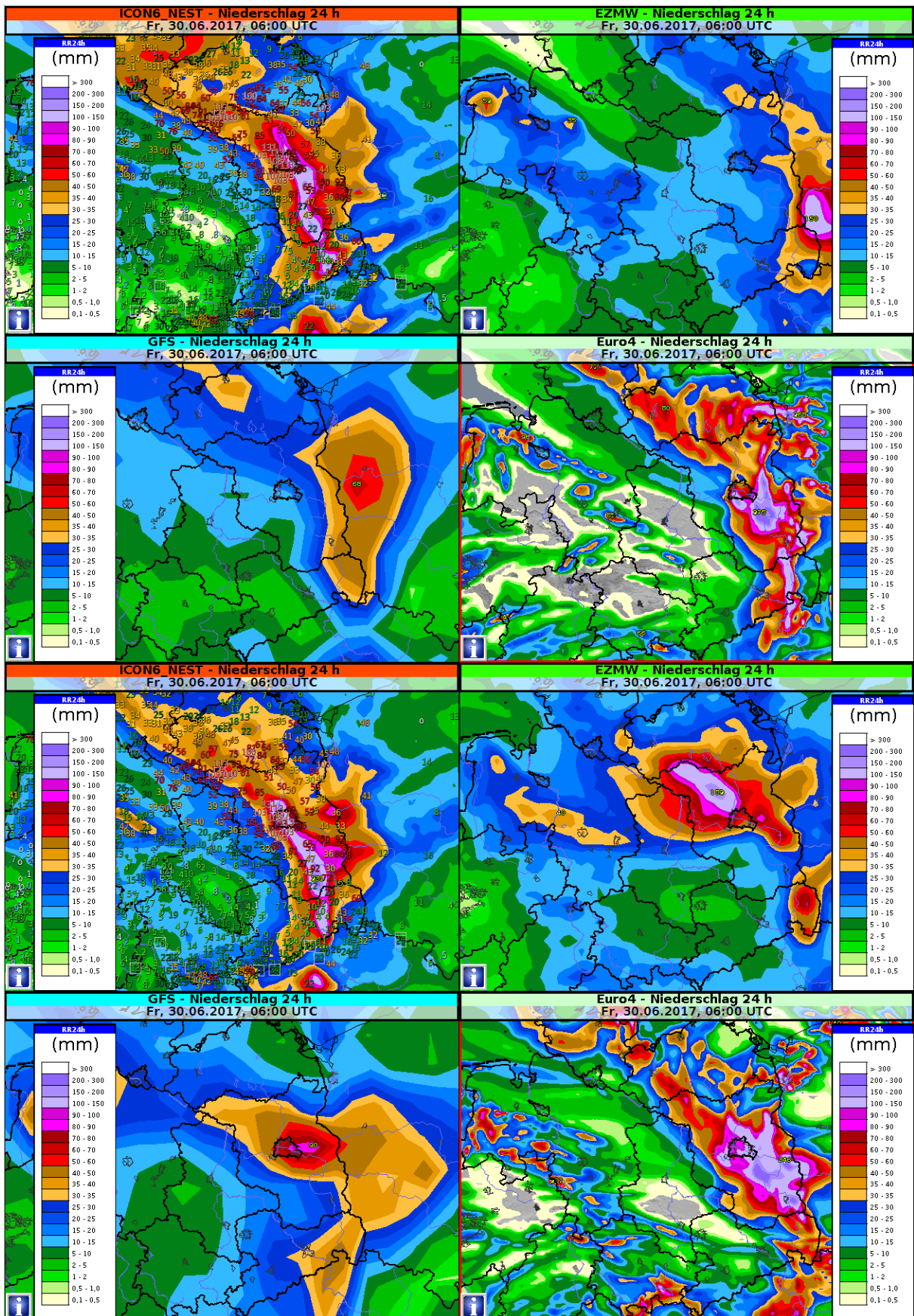


Short range forecasts, COSMO-LEPS, Q90 (isolines), probability of more than 80 mm /24 h (isoareas).
 From top to bottom: 27 June, 12 + 66 H, 28 June, 00 + 54 H, 28 June, 12 + 42 H and 29 June, 00 + 30 H





MR forecasts, 24-hr accumulated precip, 25 June, 12 + 114 H. 26 June, 00 + 102 H, 26 June, 12 + 90 H and 27 June, 00 + 78 H. Each panel: top left: DWD's ICON, top right: ECMWF HRES, bottom left: NCEP, bottom right: UKMO 4 km (available only up to 54 hrs)



Short range forecasts, 24-hr accumulated precip, 27 June, 12 + 66 H. 28 June, 00 + 54 H, 28 June, 12 + 42 H and 29 June, 00 + 30 H. Each panel: top left: DWD's ICON, top right: ECMWF HRES, bottom left: NCEP, bottom right: UKMO 4 km (available only up to 54 hrs)

4. Experience from similar cases

The cyclone travelled on a Vb-like path, the situation was typical for very heavy precip over N and NE part of Germany as well as over the E German highlands. Because of some similar cases in the summer of last years (some false alarms) the worst case scenario (Q90) was not expected so far.

5. Good and bad aspects of the forecast for the event

A severe precipitation event was to be expected already in the medium range. Somewhere over n and NE Germany in an area of approximately 100.000 sqare kilometers a precip event of around 100 mm /24 hrs could occur. For a detailed warning the area has to be made smaller. It was possible for forecasts, signed with "good", consistent good and excellent. ENS (ECMWF) was not able to provide additional benefit. EFI (not shown) gave indication for a severe event but no signals for more than 100 mm /24 hrs. The 99 percentil of ENS climate is somewhere between 20 and 30 mm.

Forecasts generally was very inconsistent, the most affected region was very late shown by:

ECMWF HRES: H + 78 good, H + 66, 42 poor (some further investigations desired), H + 54 o.k., H + 30 excellent

ECMWF ENS: Probs > 80 mm /24 hrs below 10 %, only H + 30 better

COSMO-LEPS: H + 102 and H + 78 good, H + 54, 42 and H + 30 consistent good

ICON + UKMO: H + 42 and H + 30 good

Thomas Schumann, Senior Forecaster, DWD