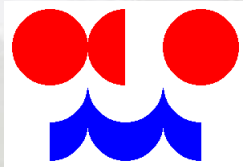


# **Flash Floods in Czech Republic**

## **22. June – 7. July 2009**

Jan Kubát  
Jan Daňhelka  
Petr Šercl



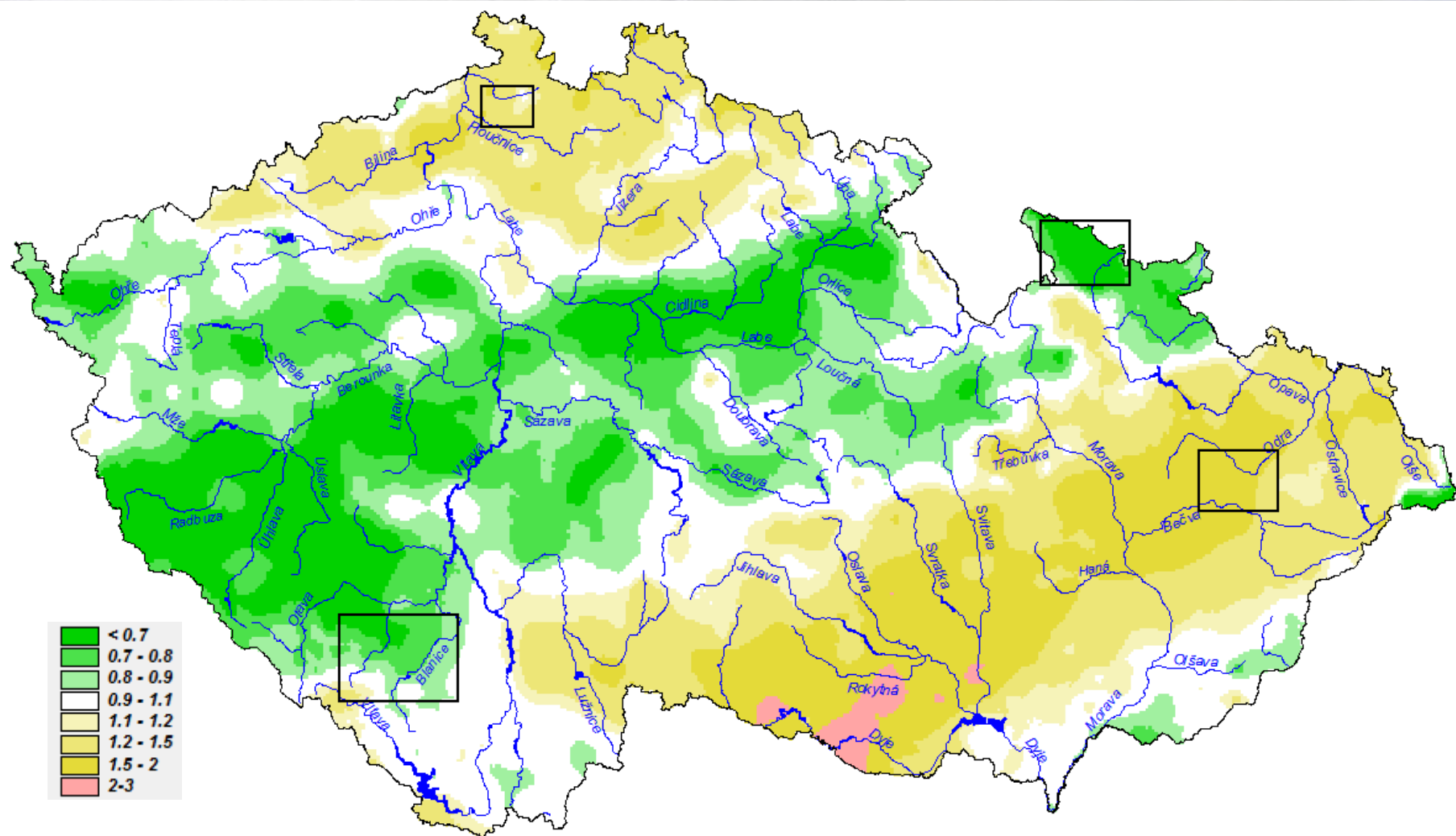
**Czech Hydrometeorological Institute**

## **Meteorological causes:**

- stable synoptic situation (12 days) with the current of warm, wet and instable air from E or SE
- everyday storms with heavy rains i many placec of the country
- „train effect“ – storm cells progress in the same direction over the same area (Novojičínsko 24. 6. , Jesenicko 26. 6.)

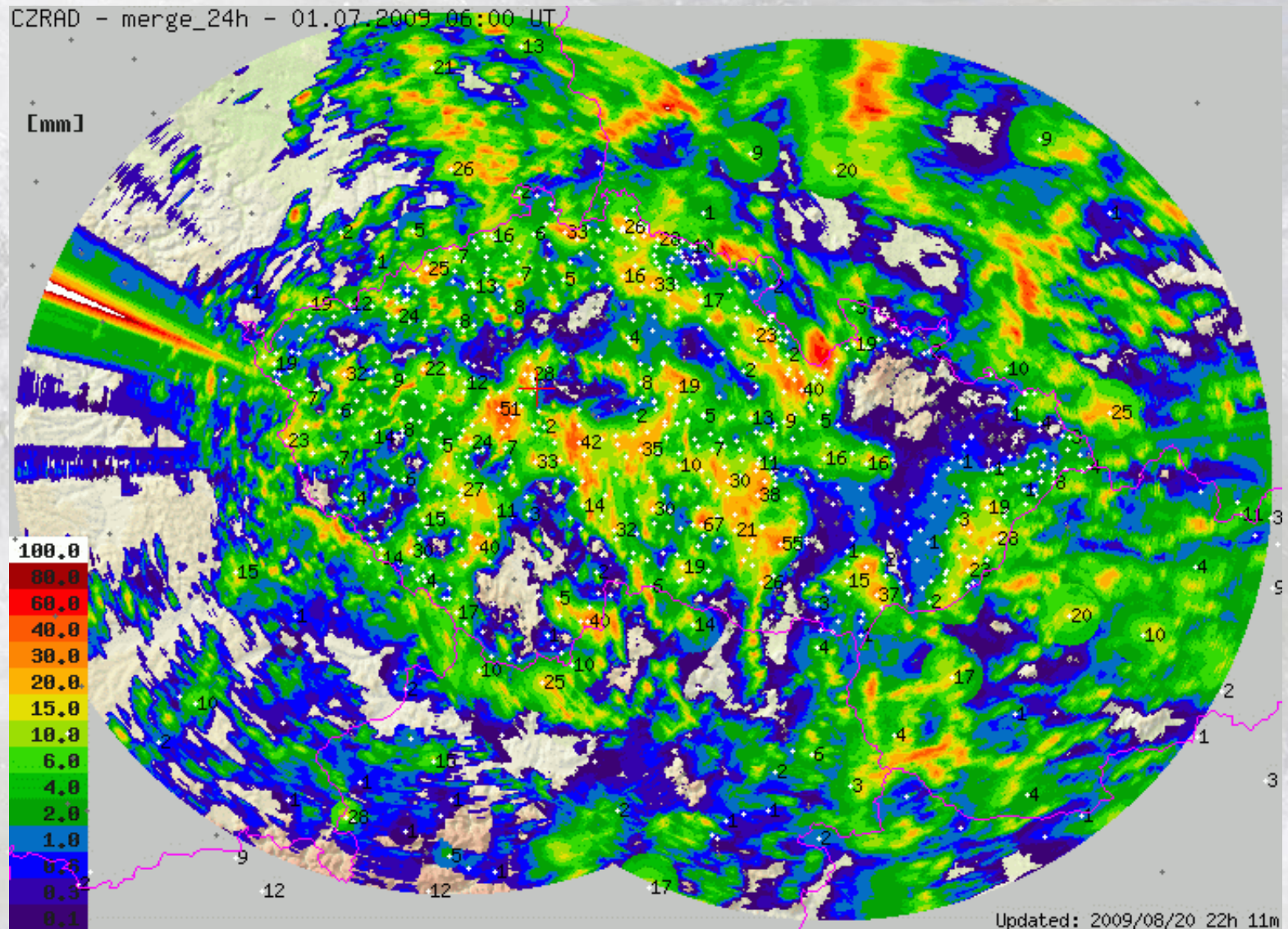
# Soil moisture 21. June before the floods

## real API / normal API (1961–2005)



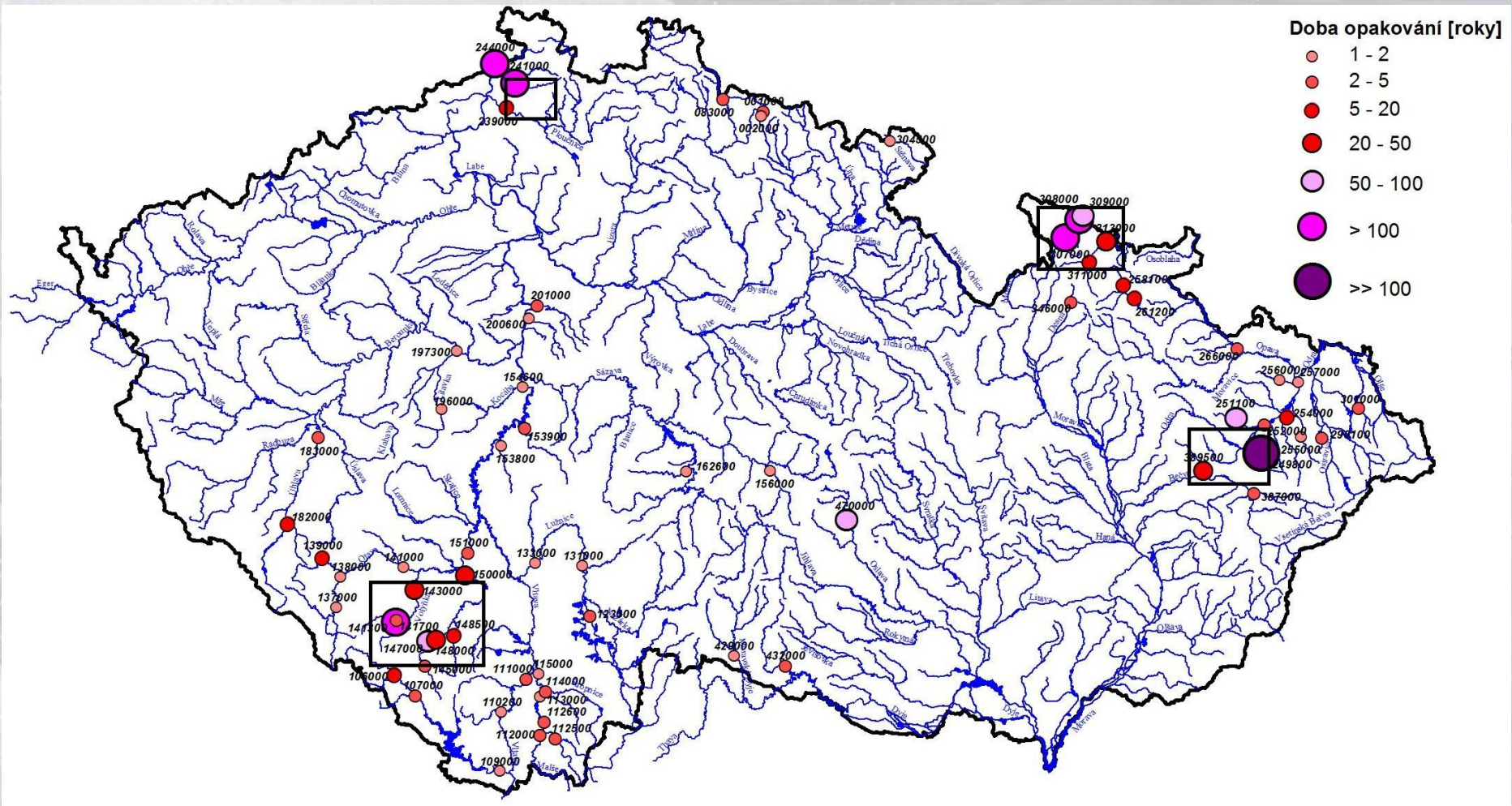


# 24 hours precipitation 30. June 2009 (1.7. morning) radar and ground measurement

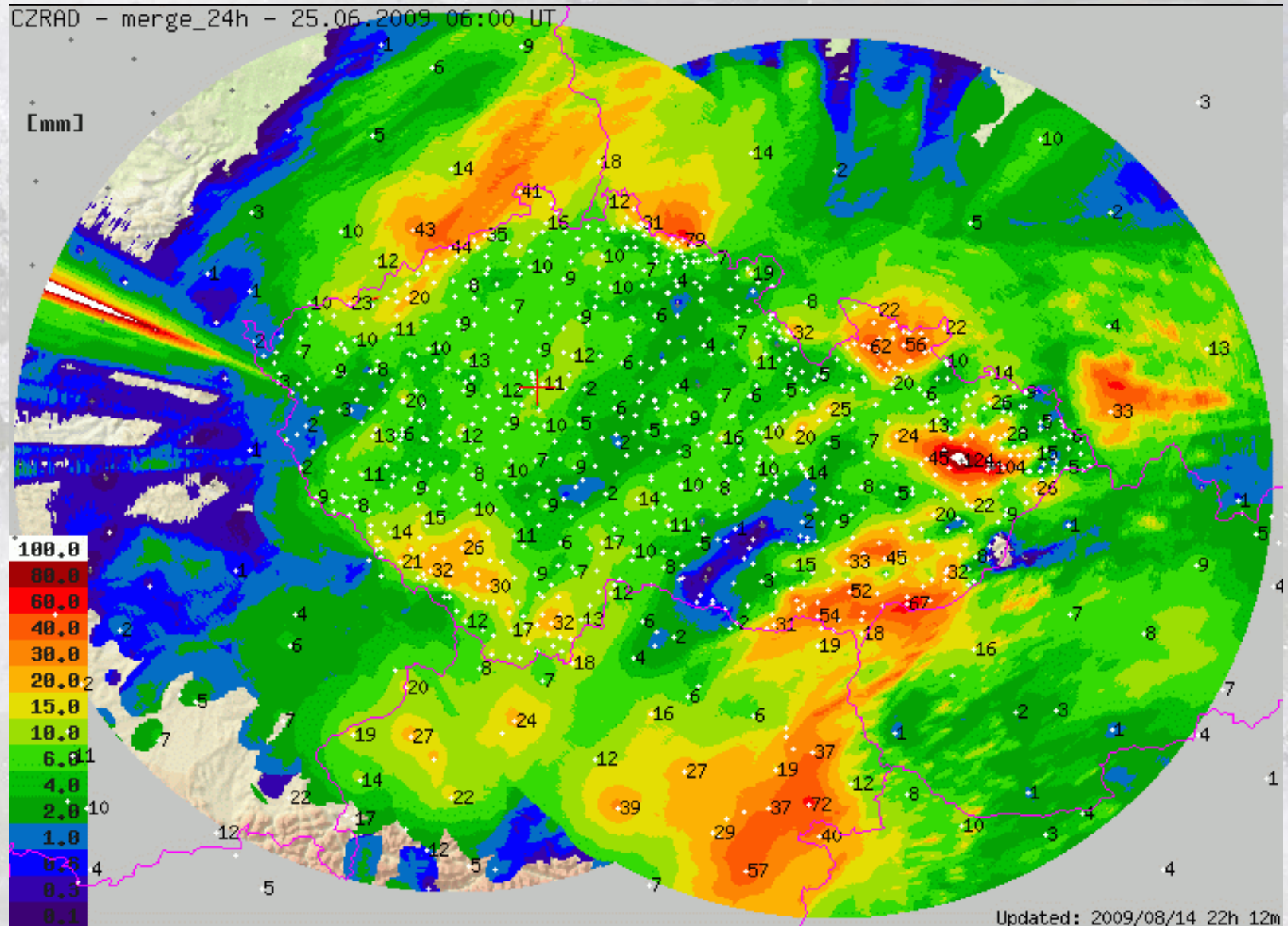




# Flash Floods 2009 – maximum discharges extremity

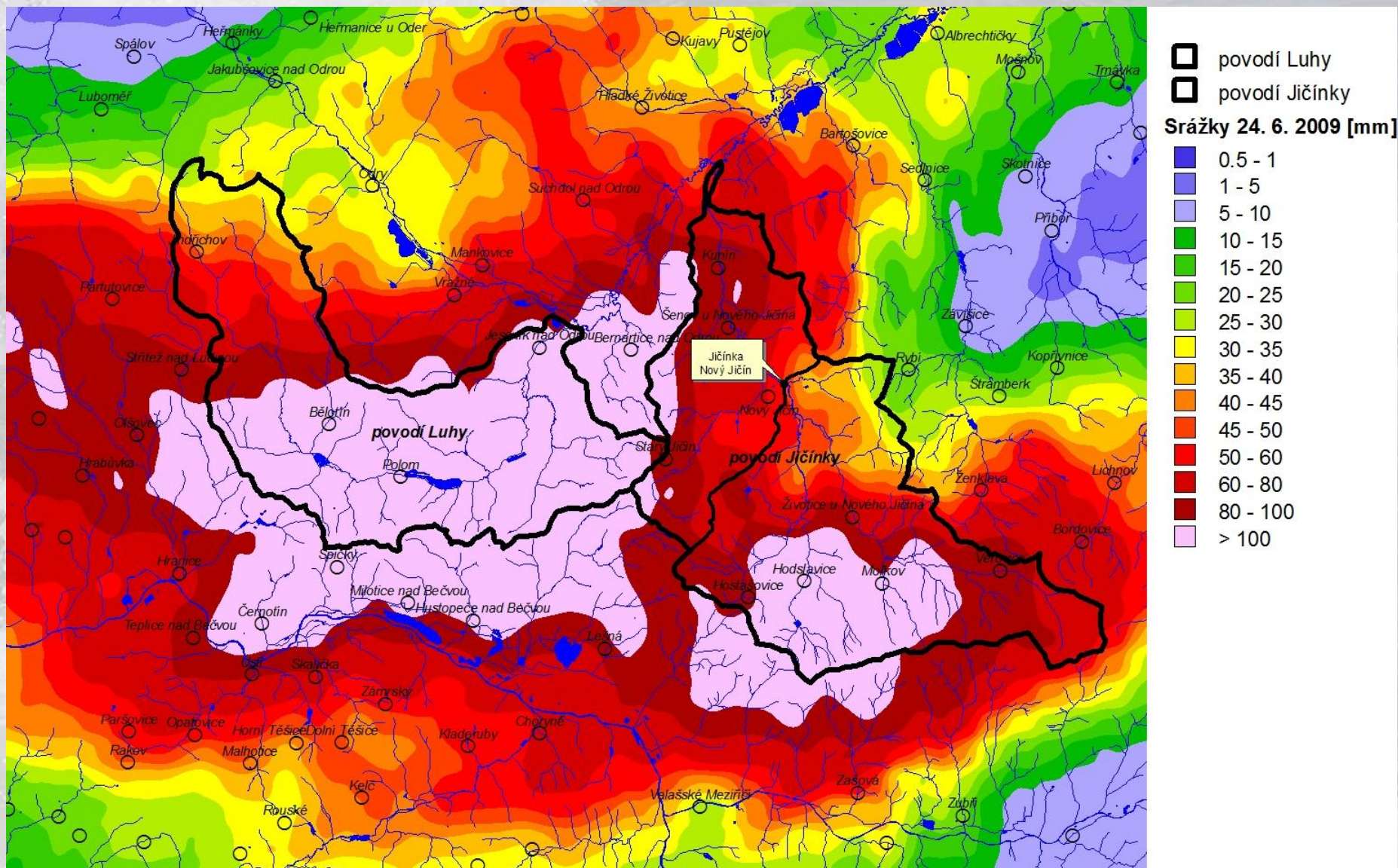


# 24 hours precipitation 24. June 2009 (25.6. morning) radar and ground measurement

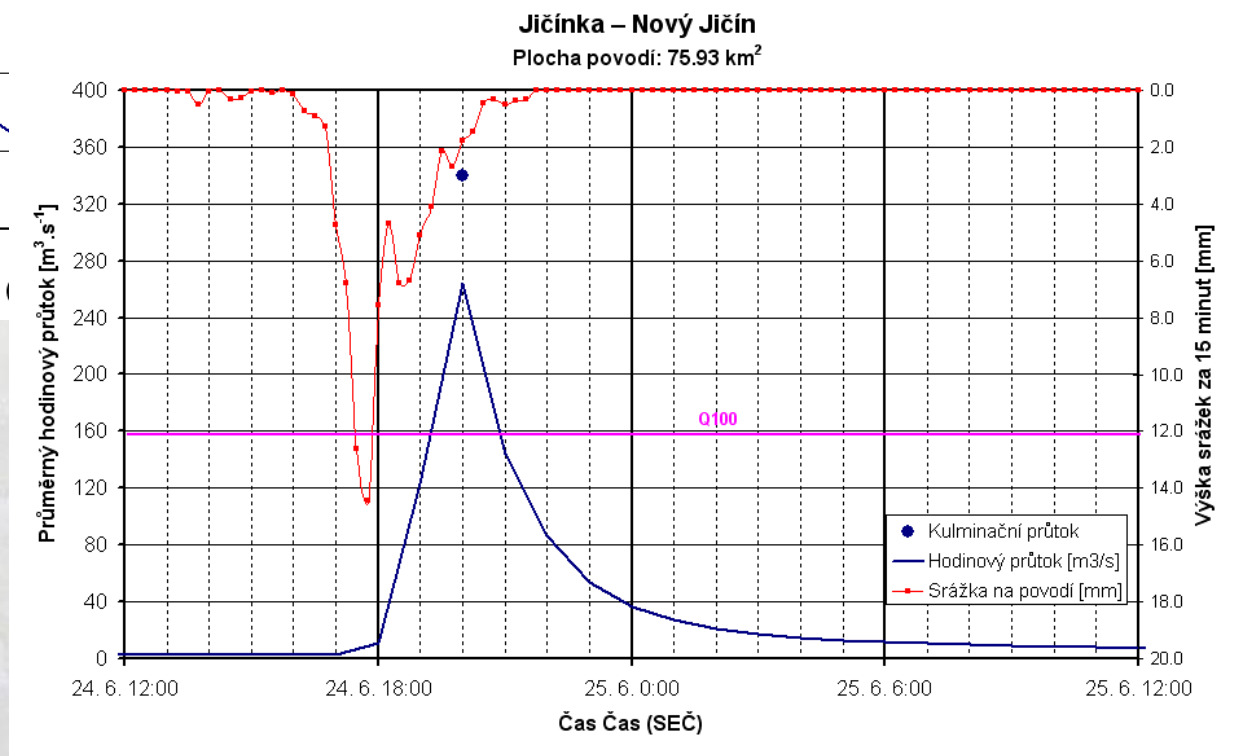
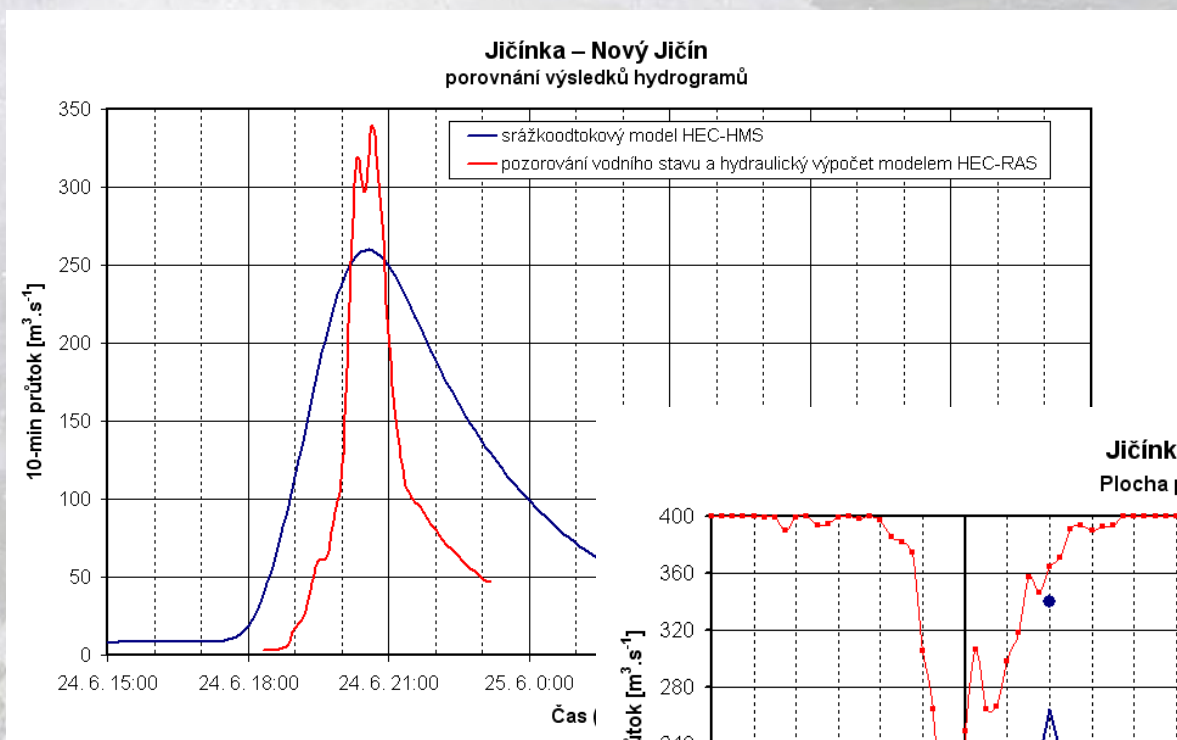




# Flash Flood 24. 6. 2009 – Novojičínsko (rainfall distribution)



# Flash Flood on Jičínka river (model hydrogram - measurement)





# Flash Floods 2009 – Luha river catchment above Jeseník nad Odrou





# Flash Floods 2009 – Jeseník nad Odrou





# Flash Floods 2009 – Jeseník nad Odrou



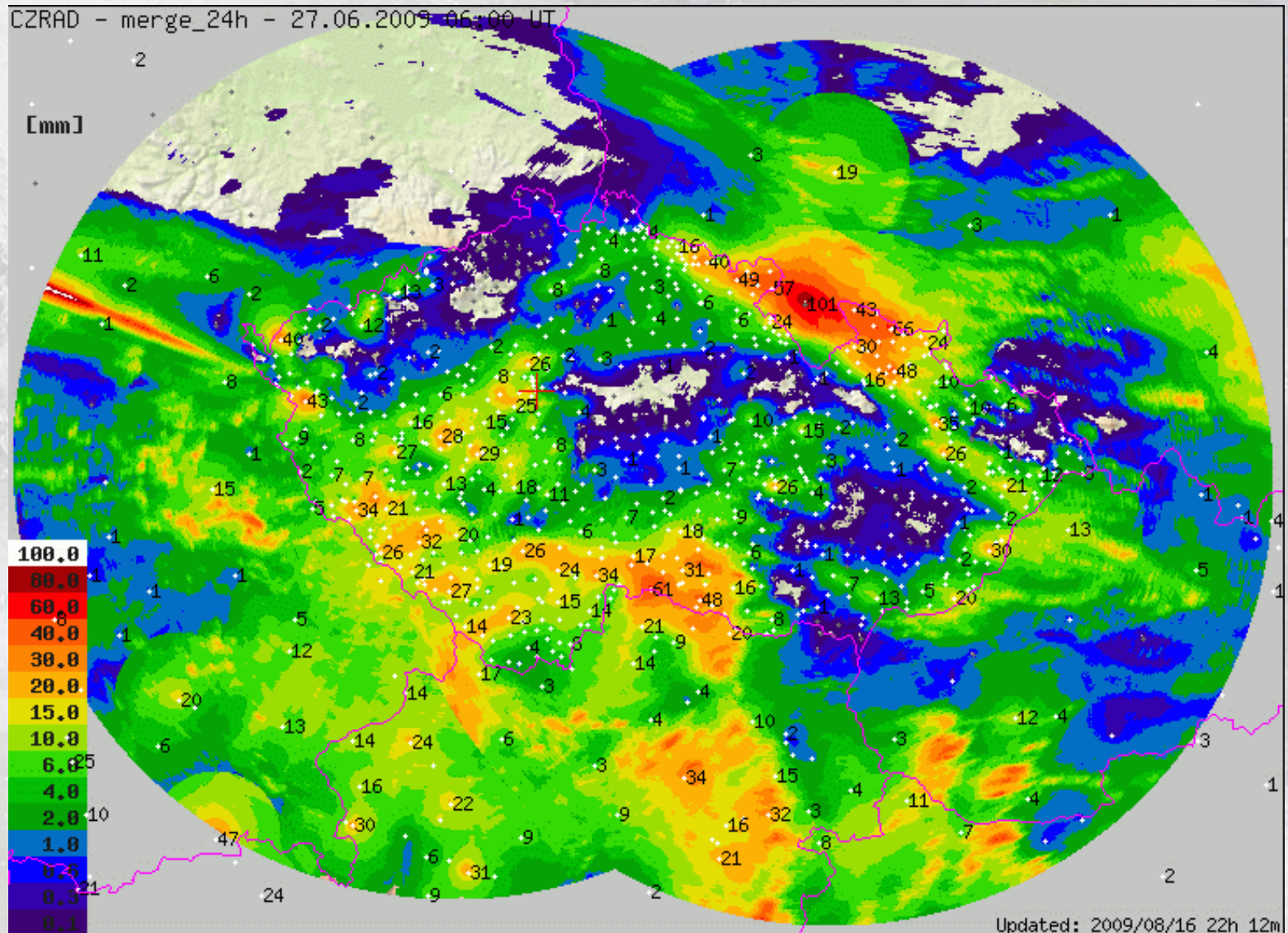


# Flash Floods 2009 – Starý Jičín

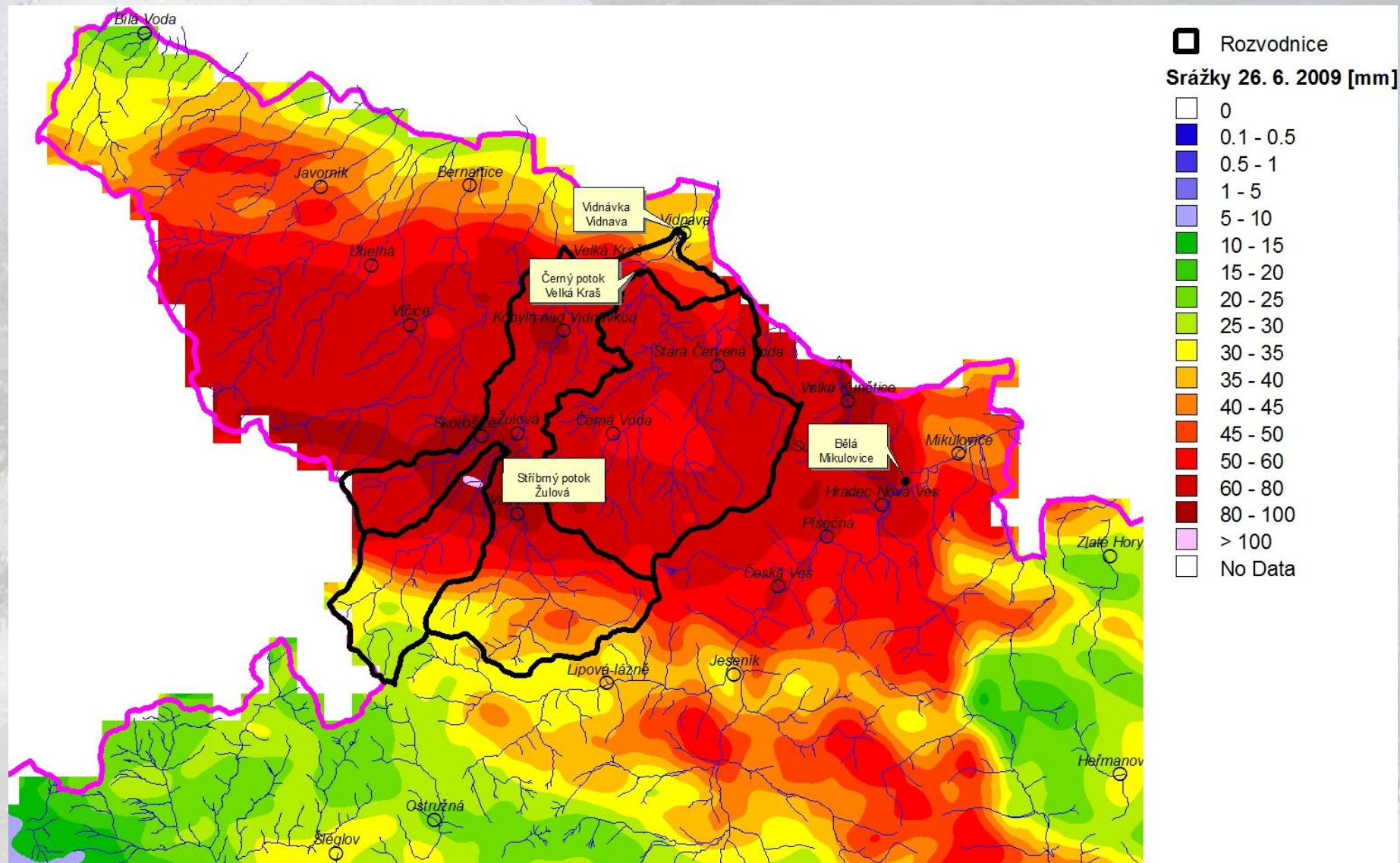




# 24 hours precipitation 26. June 2009 (27.6. morning) radar and ground measurement

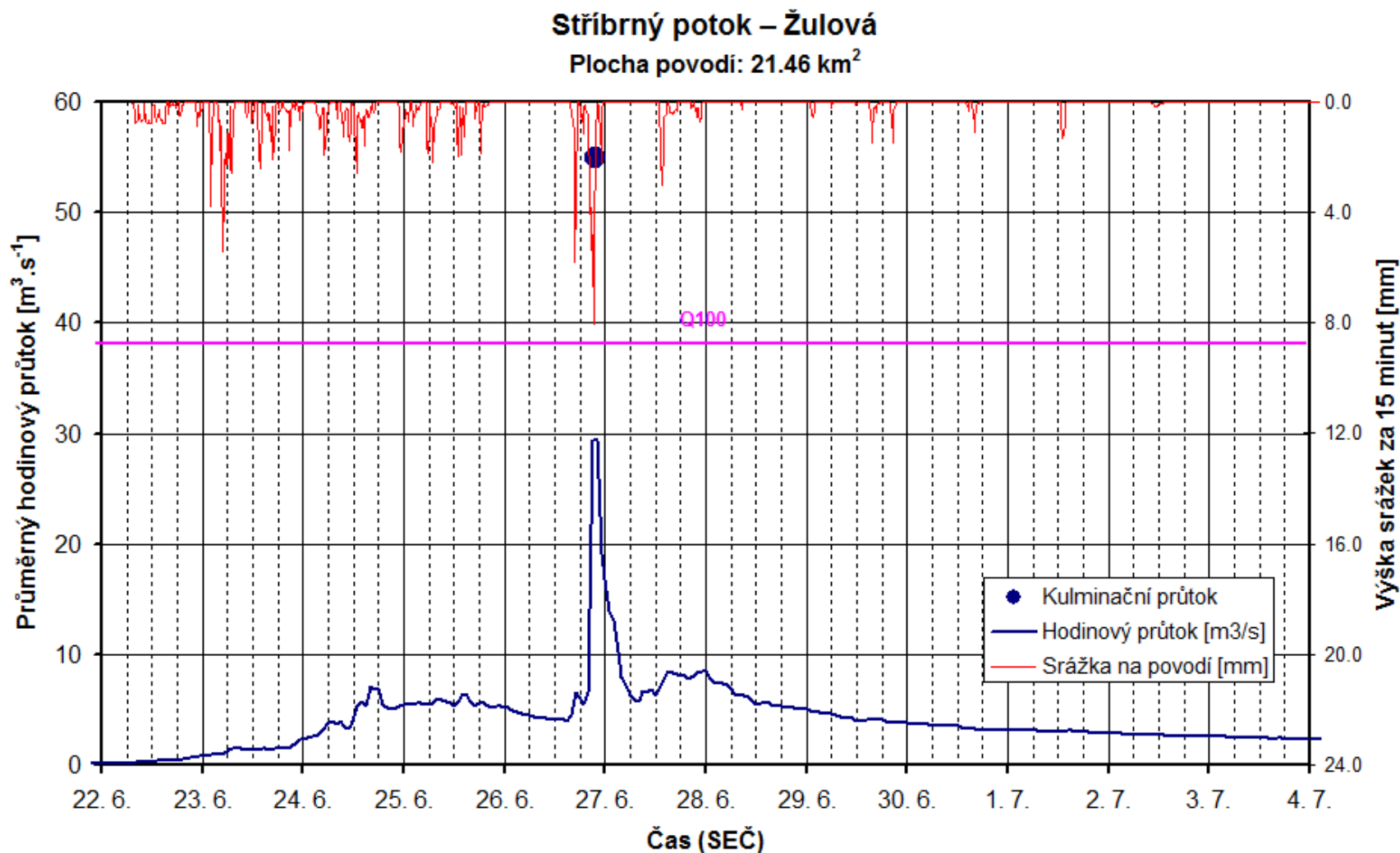


# Flash Flood 26. 6. 2009 – Jesenicko (rainfall distribution)





# Flash Flood on Stříbrný brook (hydrogram in gauging station Žulová)



# Flash Floods 2009 – erosion sediment transport





# Flash Floods 2009 – Žulová



Žulová - chodník z Mariánského náměstí k MŠ



# Flash Floods 2009 – Javorník

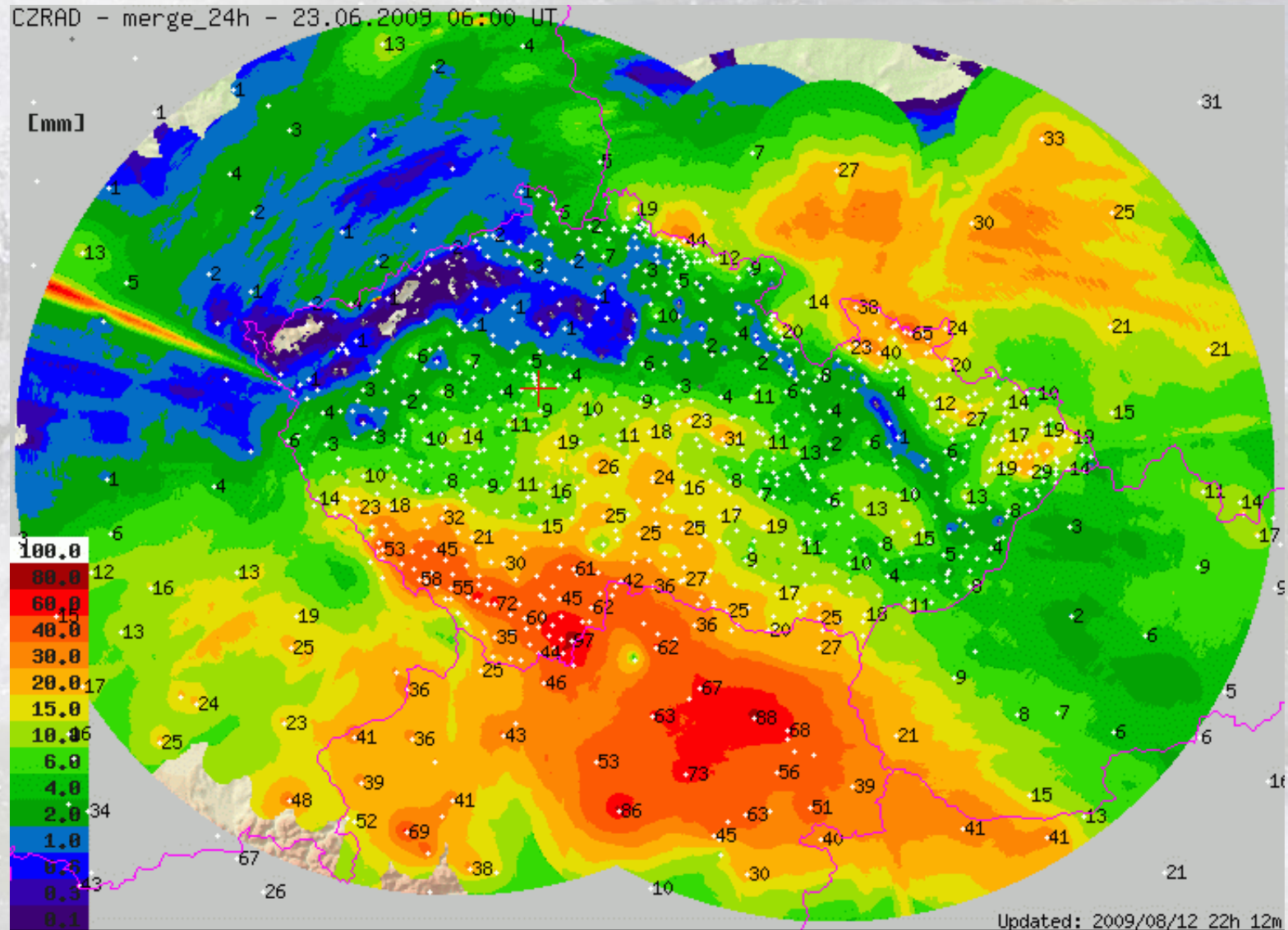




# Flash Floods 2009 – Javorník

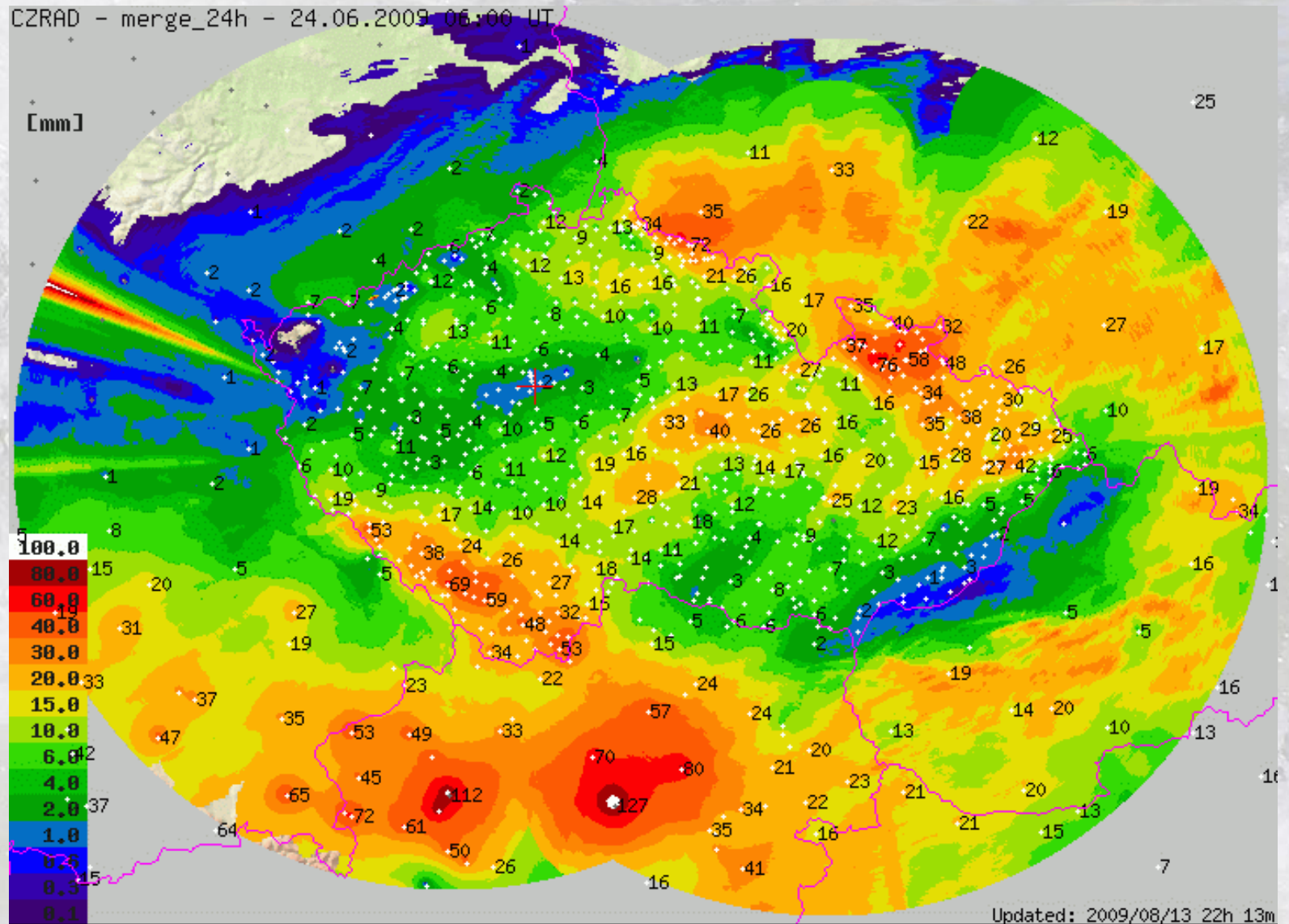


# 24 hours precipitation 22. June 2009 (23.6. morning) radar and ground measurement



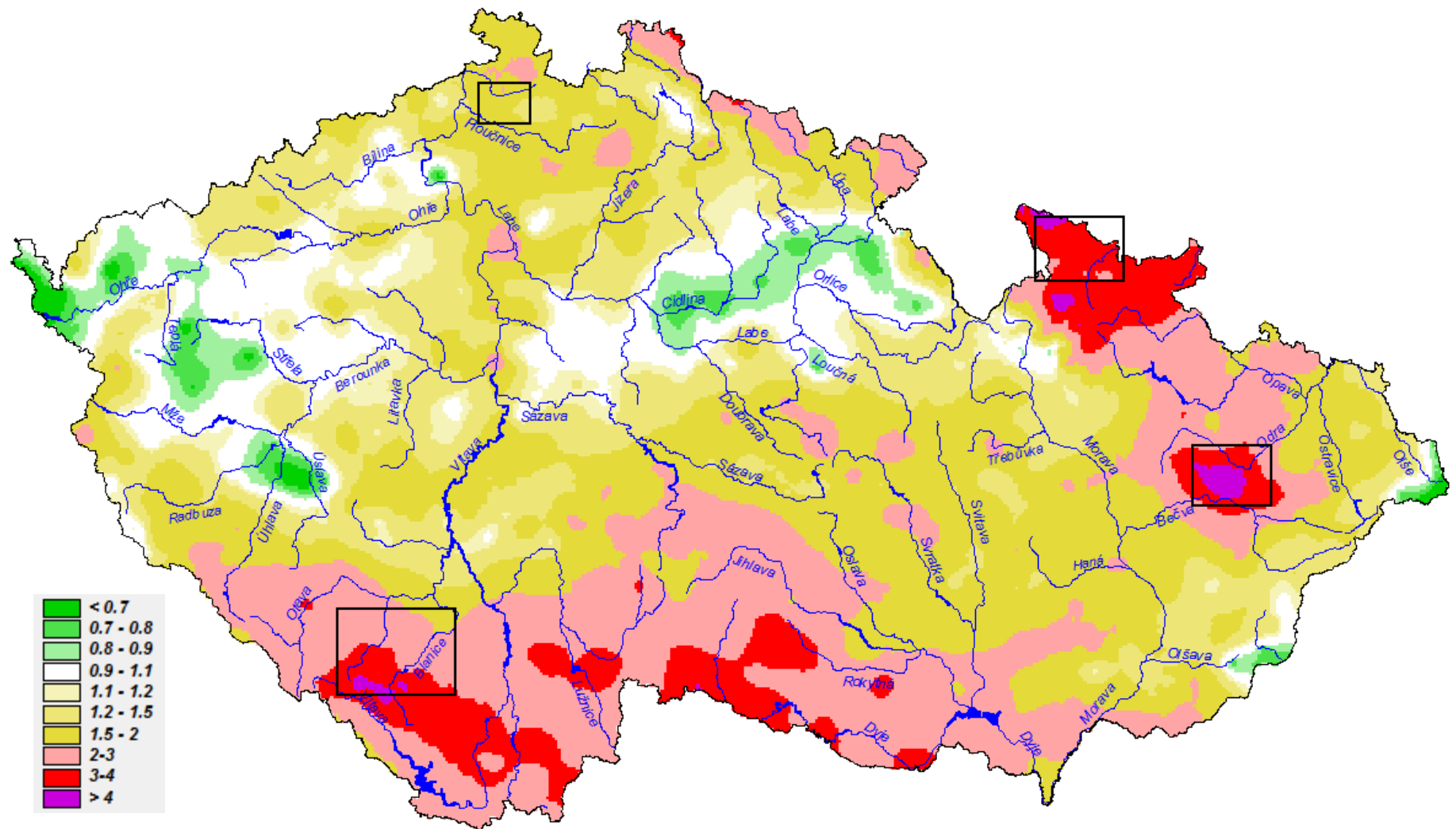


# 24 hours precipitation 23. June 2009 (24.6. morning) radar and ground measurement



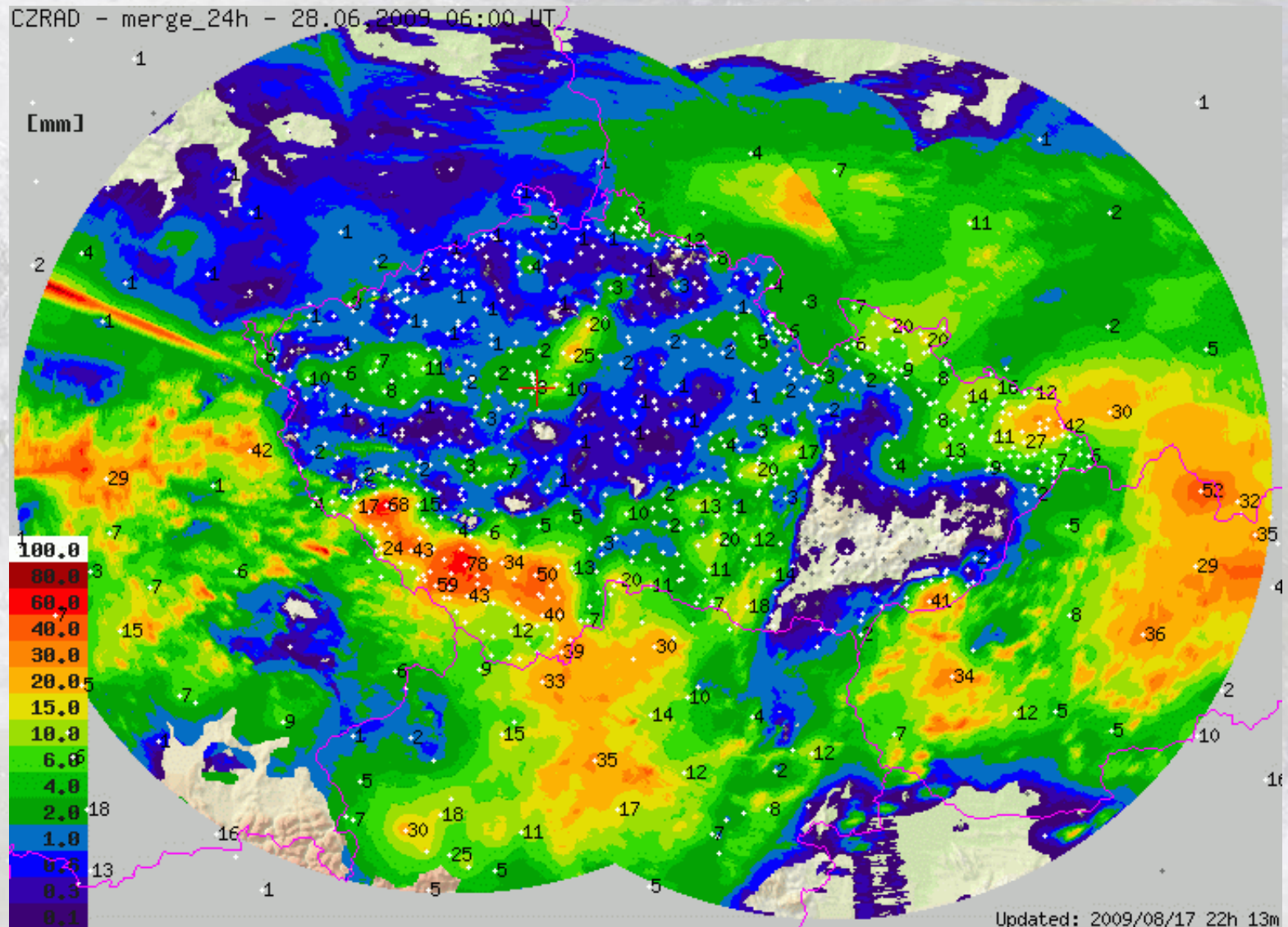
# Soil moisture 27. June after the floods

## real API / normal API (1961–2005)



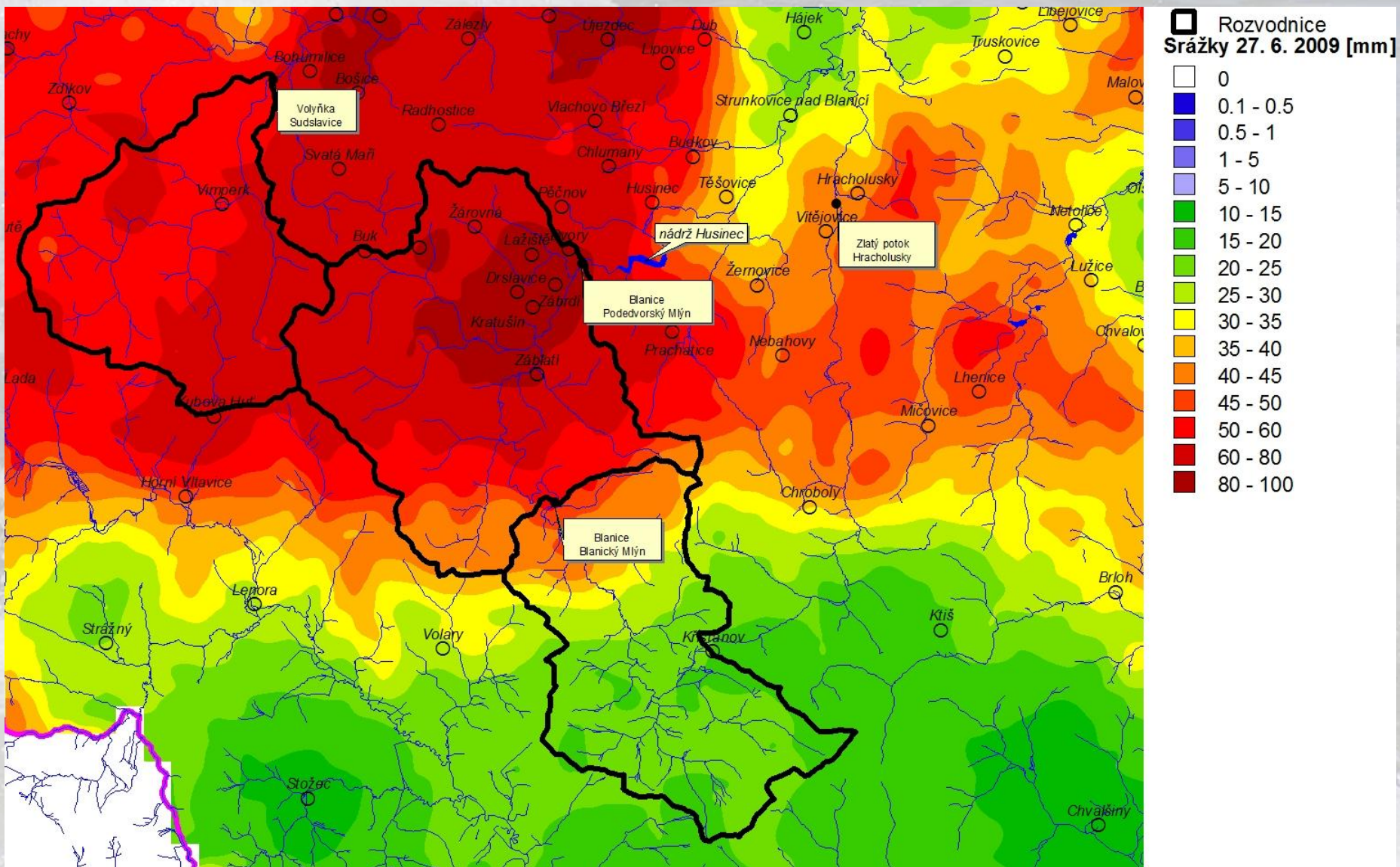


# 24 hours precipitation 27. June 2009 (28.6. morning) radar and ground measurement





## Flash Flood 27. 6. 2009 – Blanice, Volyňka (rainfall distribution)

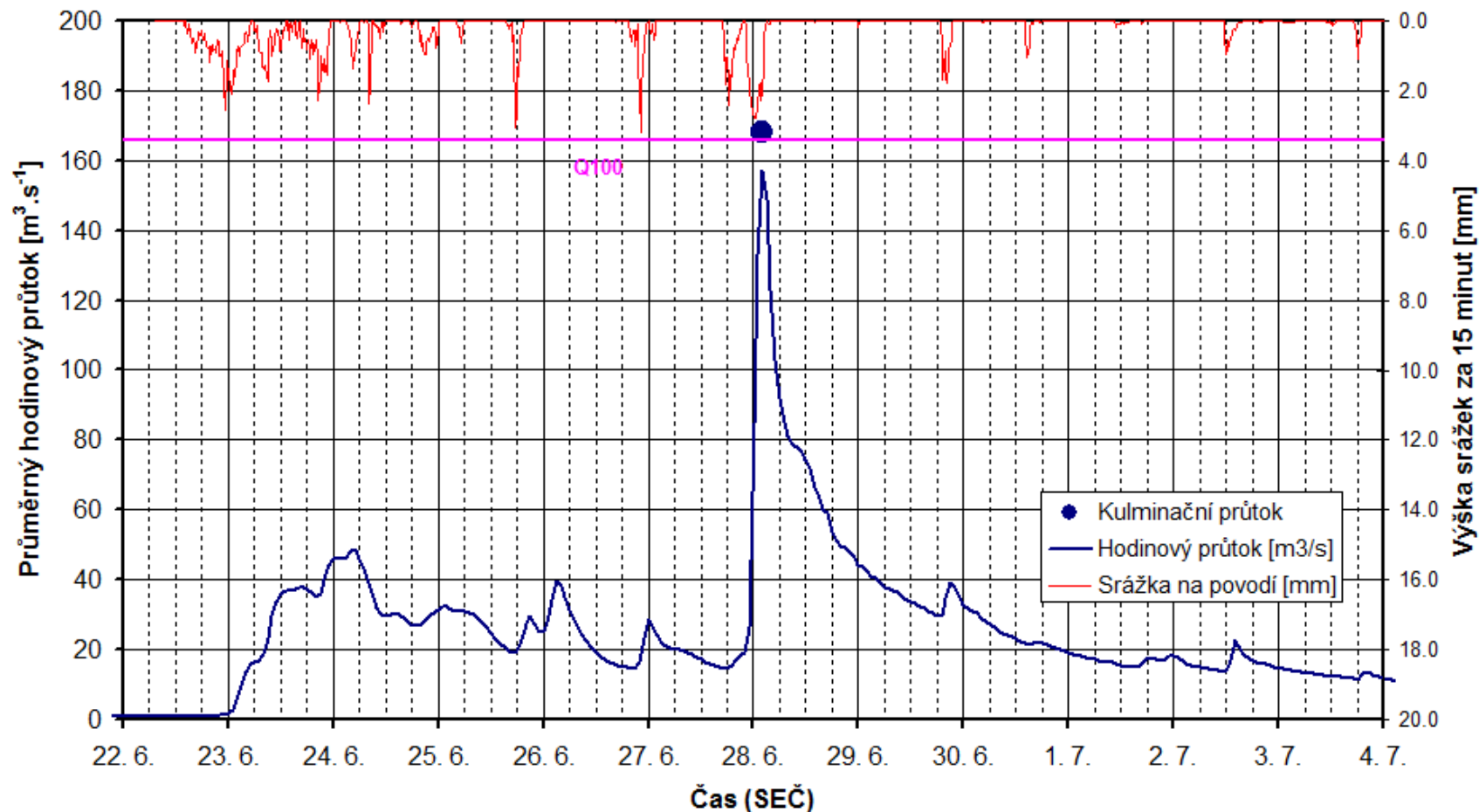




# Flash Flood on Blanice river (hydrogram in gauging station Podedvory)

Blanice – Podedvorský Mlýn

Plocha povodí: 202.76 km<sup>2</sup>





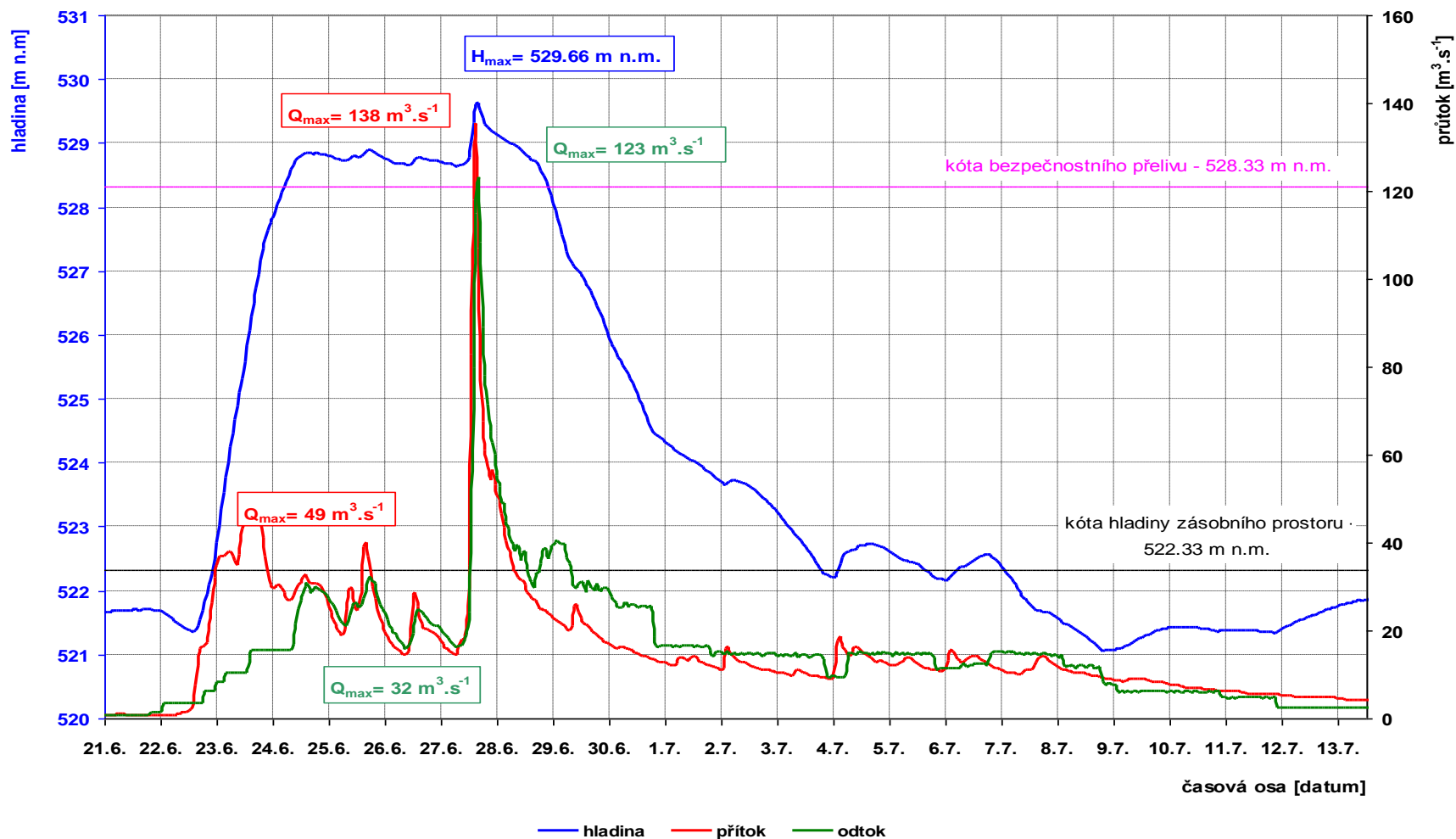
# **Reservoir Husinec on Blanice river (catchment 212 km<sup>2</sup>, retention volume 2,8 mil. m<sup>3</sup>)**



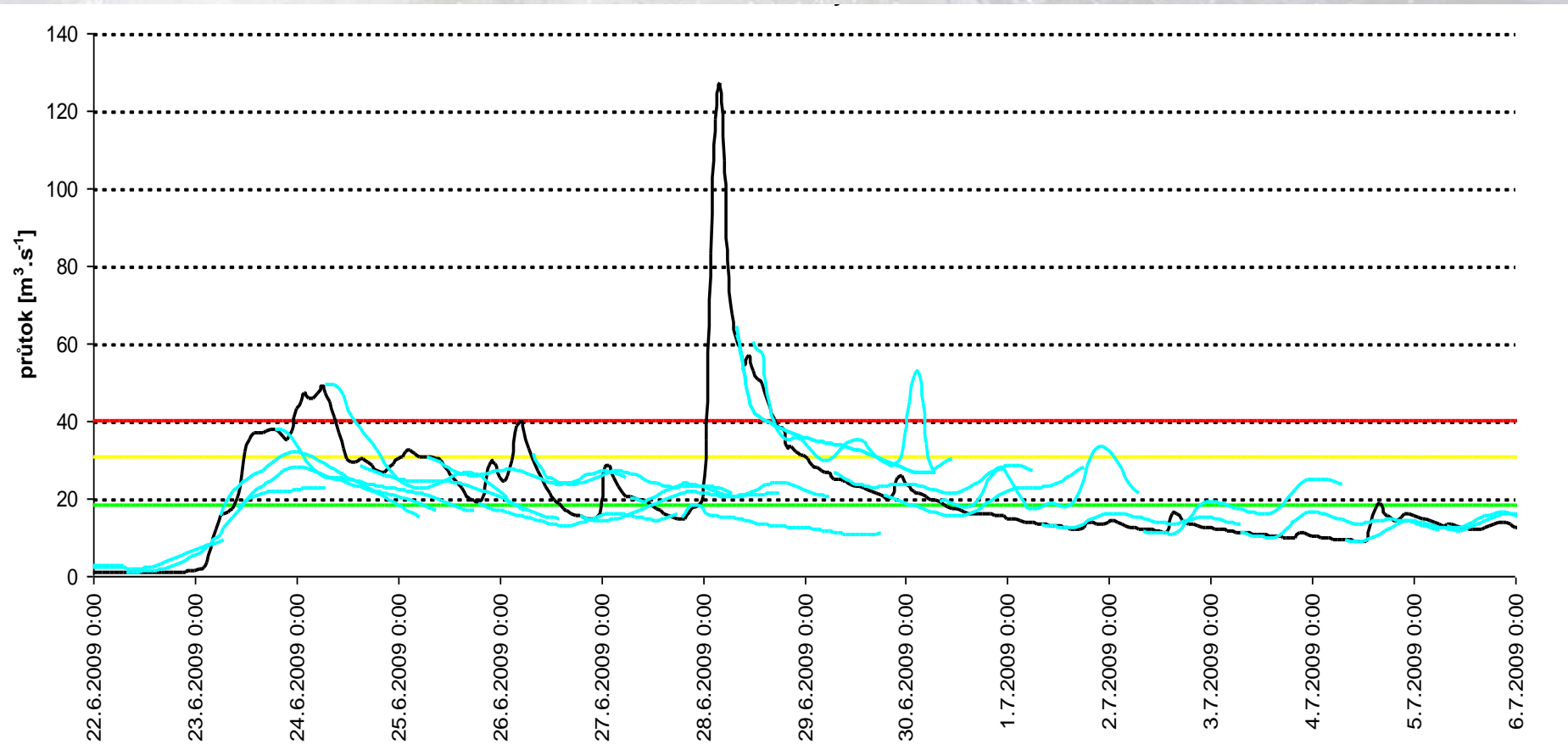


# Reservoir Husinec on Blanice river

(catchment 212 km<sup>2</sup>, retention volume 2,8 mil. m<sup>3</sup>)

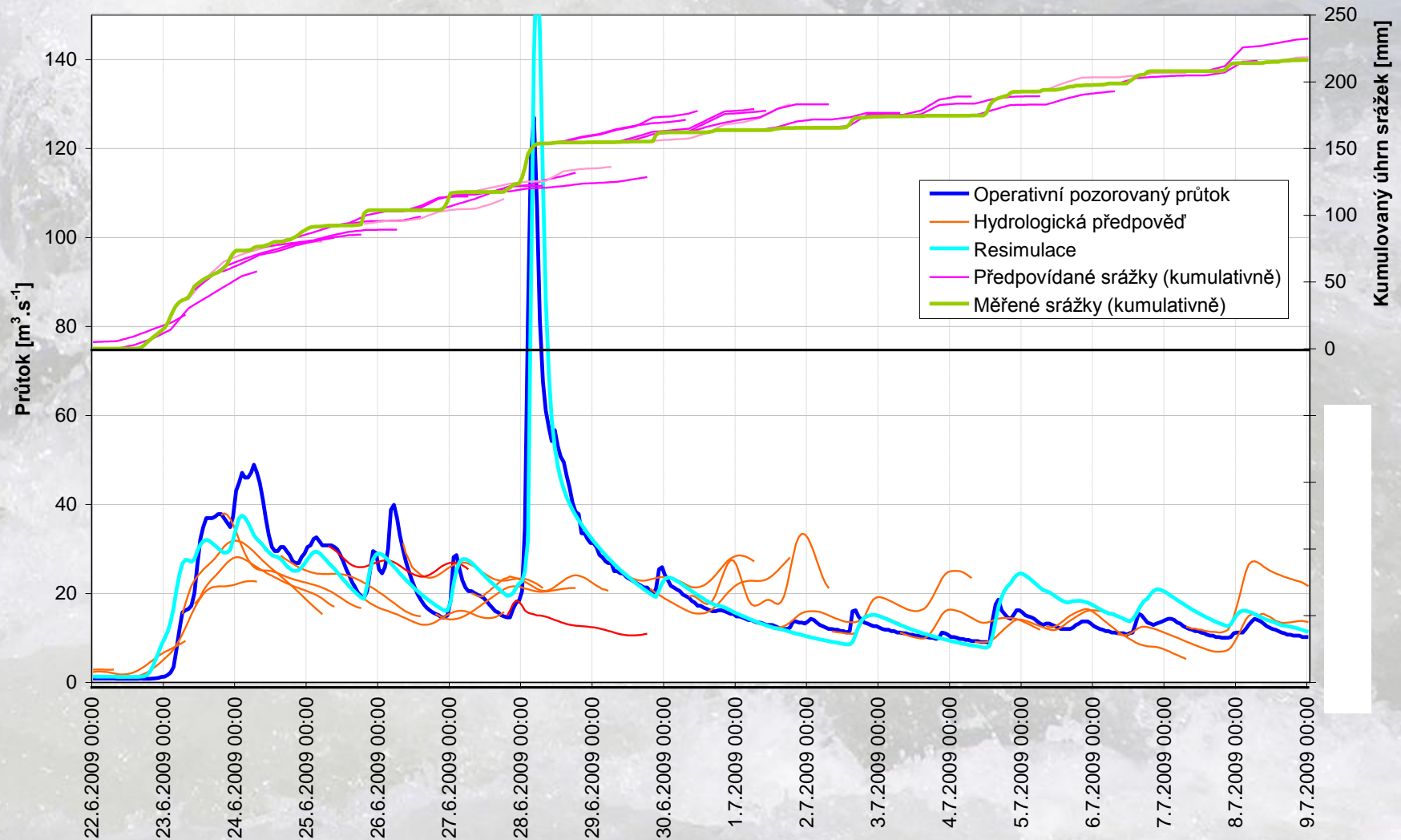


# Hydrological Forecast for Blanice river (gauging station Podedvory, catchment 203 km<sup>2</sup>)

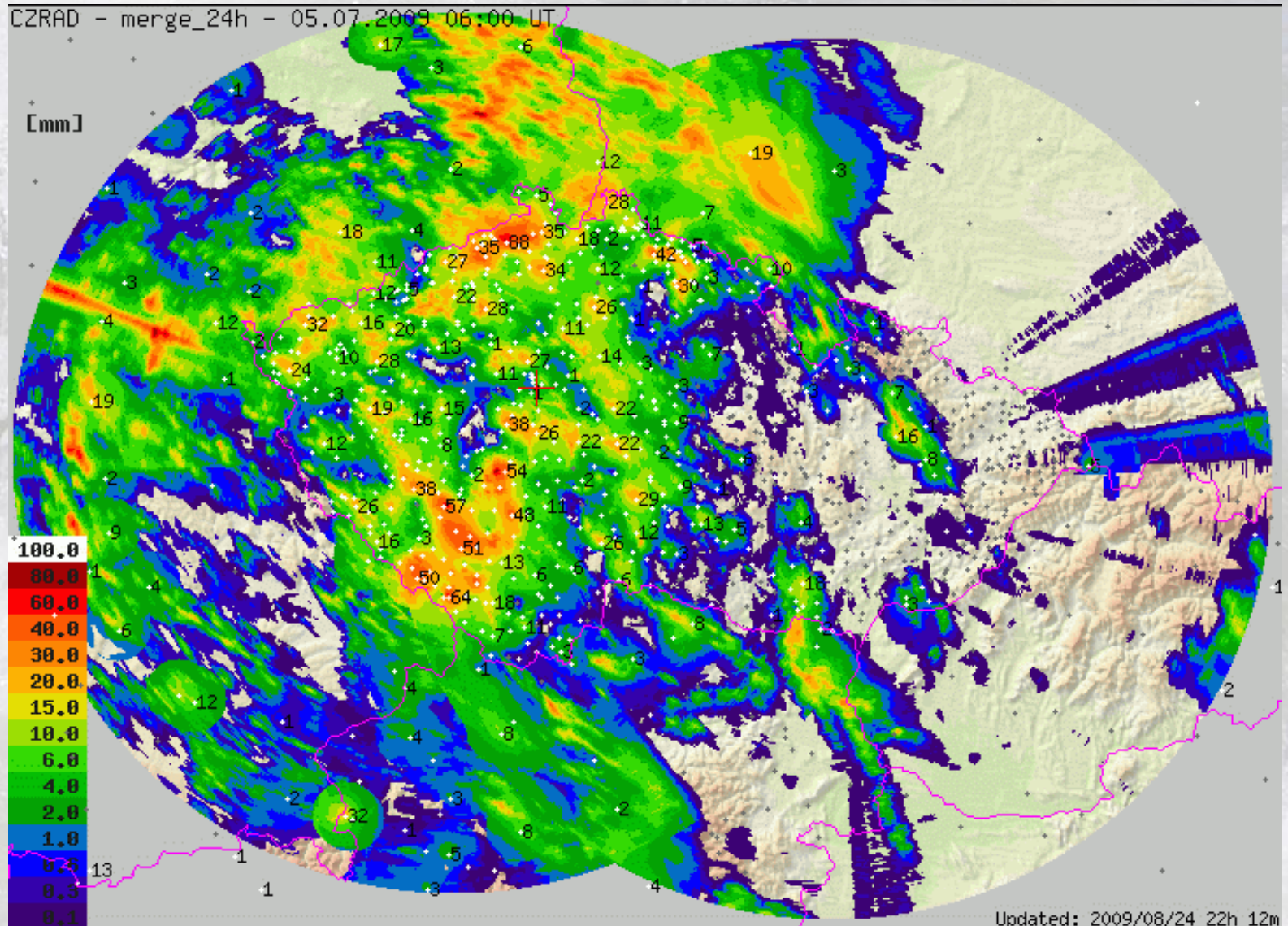




# Hydrological Forecast for Blanice river (simulation with real precipitation as input)

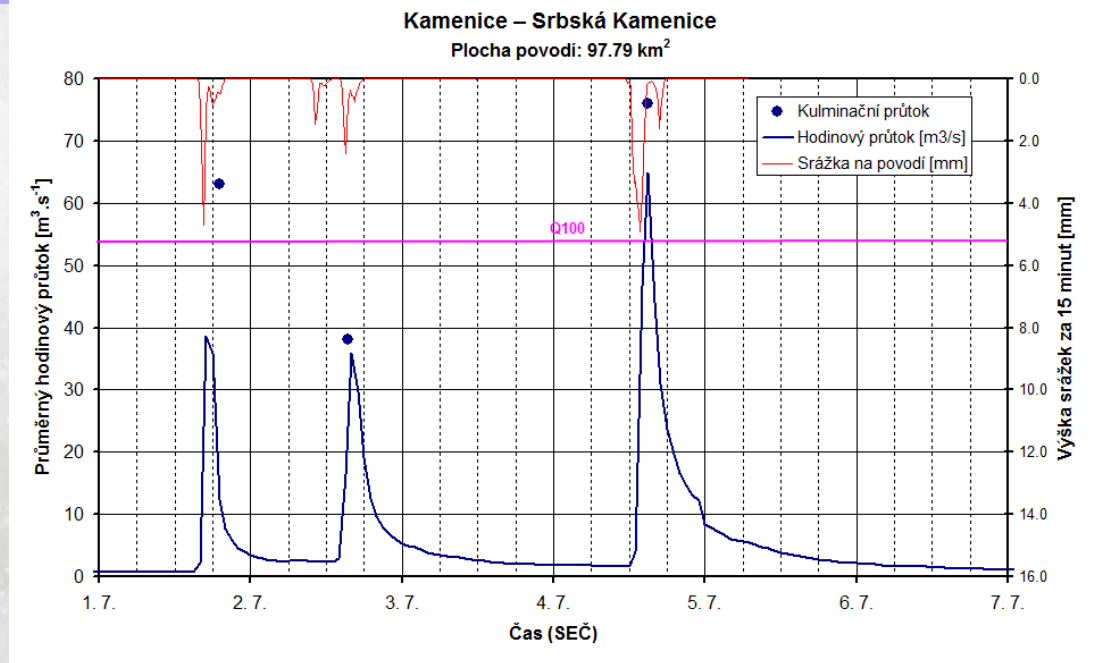
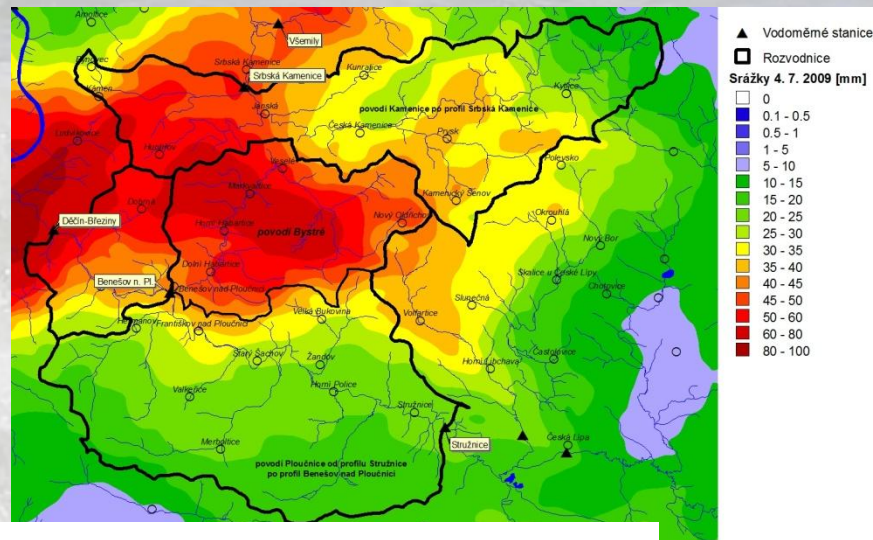
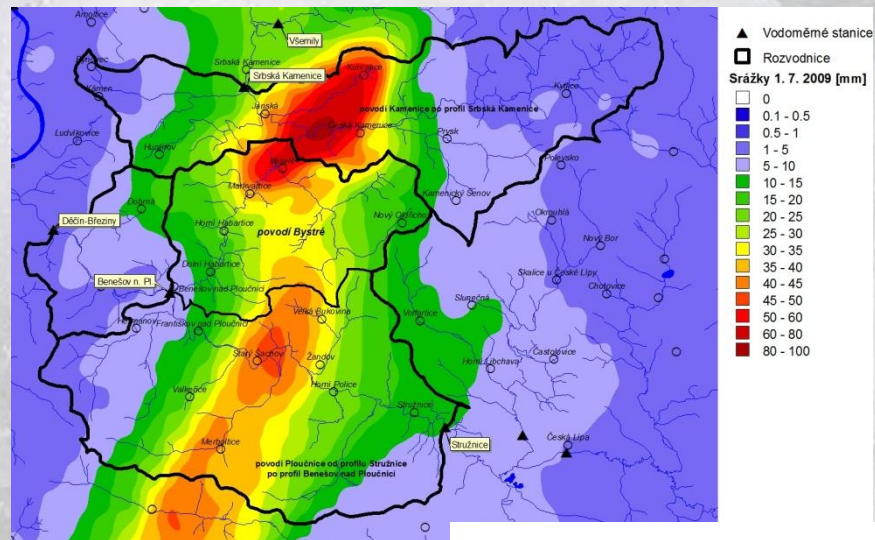


# 24 hours precipitation 4. July 2009 (5.7. morning) radar and ground measurement





# Flash Flood on Kamenice river basin 1. a 4. 7. 2009 (hydrogram in gauging station Srbská Kamenice)





# Flash Floods 2009

## Benešov nad Ploučnicí



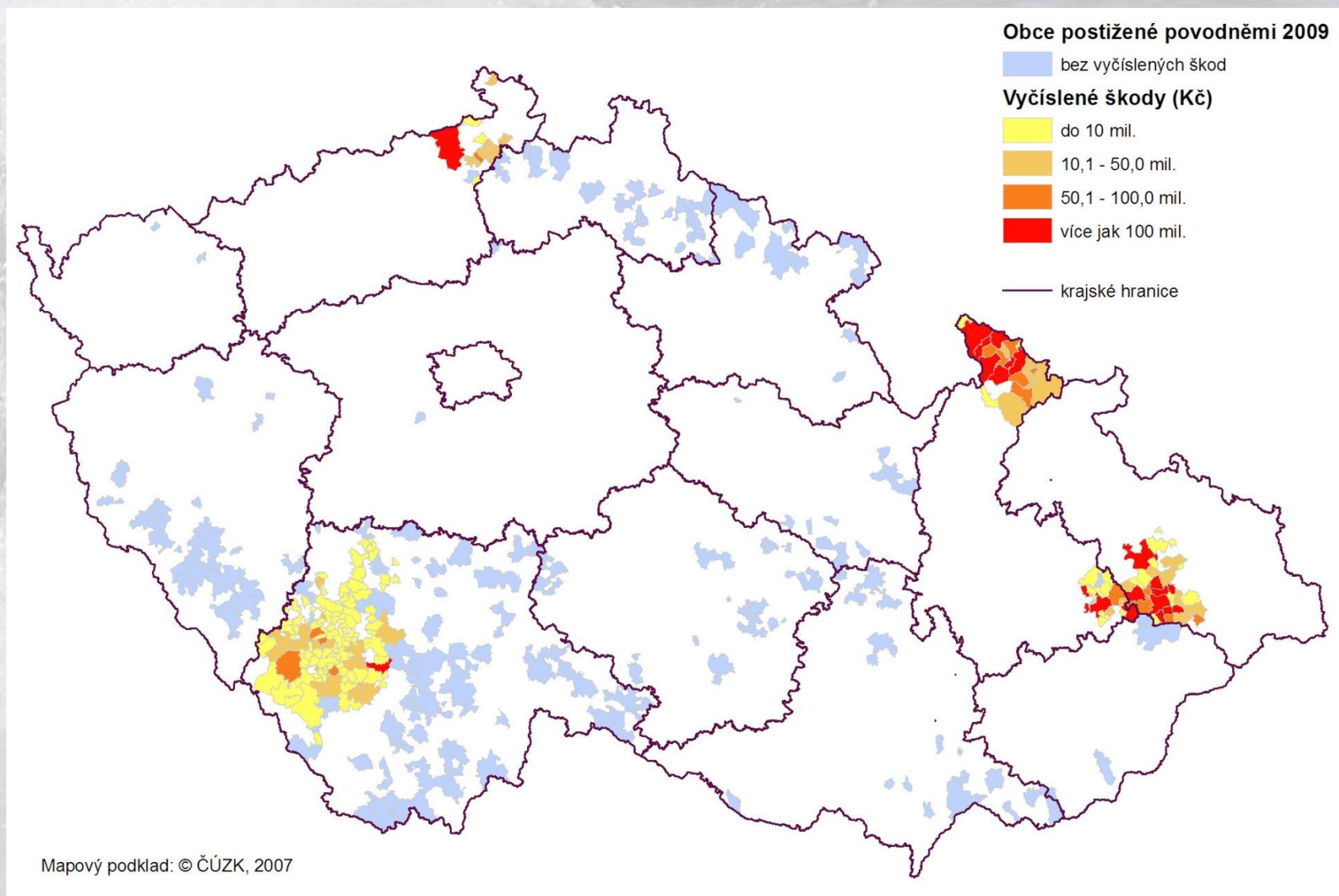


# Flash Floods 2009

## Benešov nad Ploučnicí

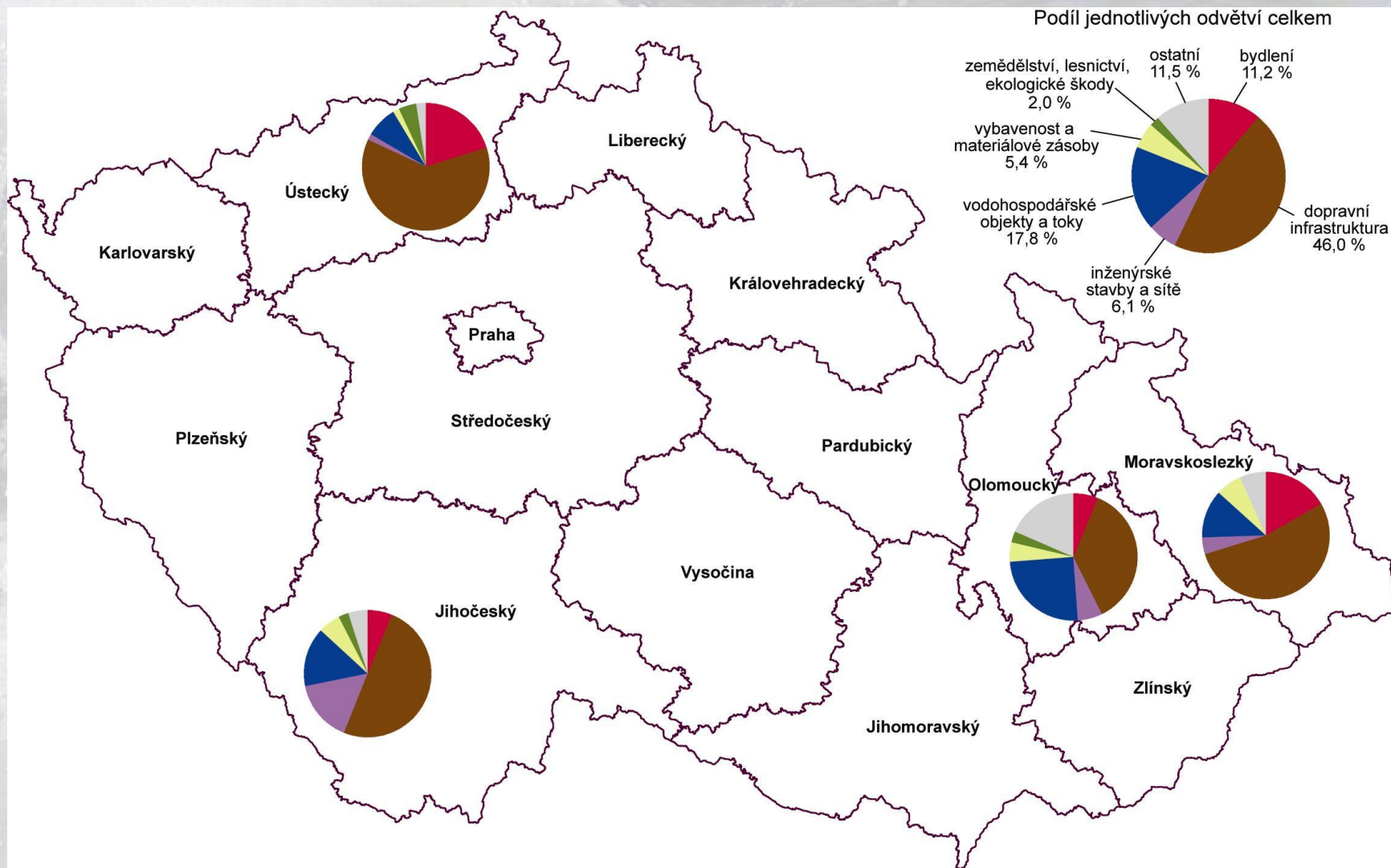


# Flash Floods 2009 – municipalities disturbed by floods





# Flash Floods 2009 – flood losses of different kinds (8 424 mil.Kč, 15 fatalities)



# Flash Floods 2009





# Flash Floods 2009





# Flash Floods 2009





# Flash Floods 2009





# Flash Floods 2009

