

# „Quantifying and communicating uncertainty illustrated by the example of forecast of heavy precipitation that caused catastrophic floods in Serbia and the region in May 2014“



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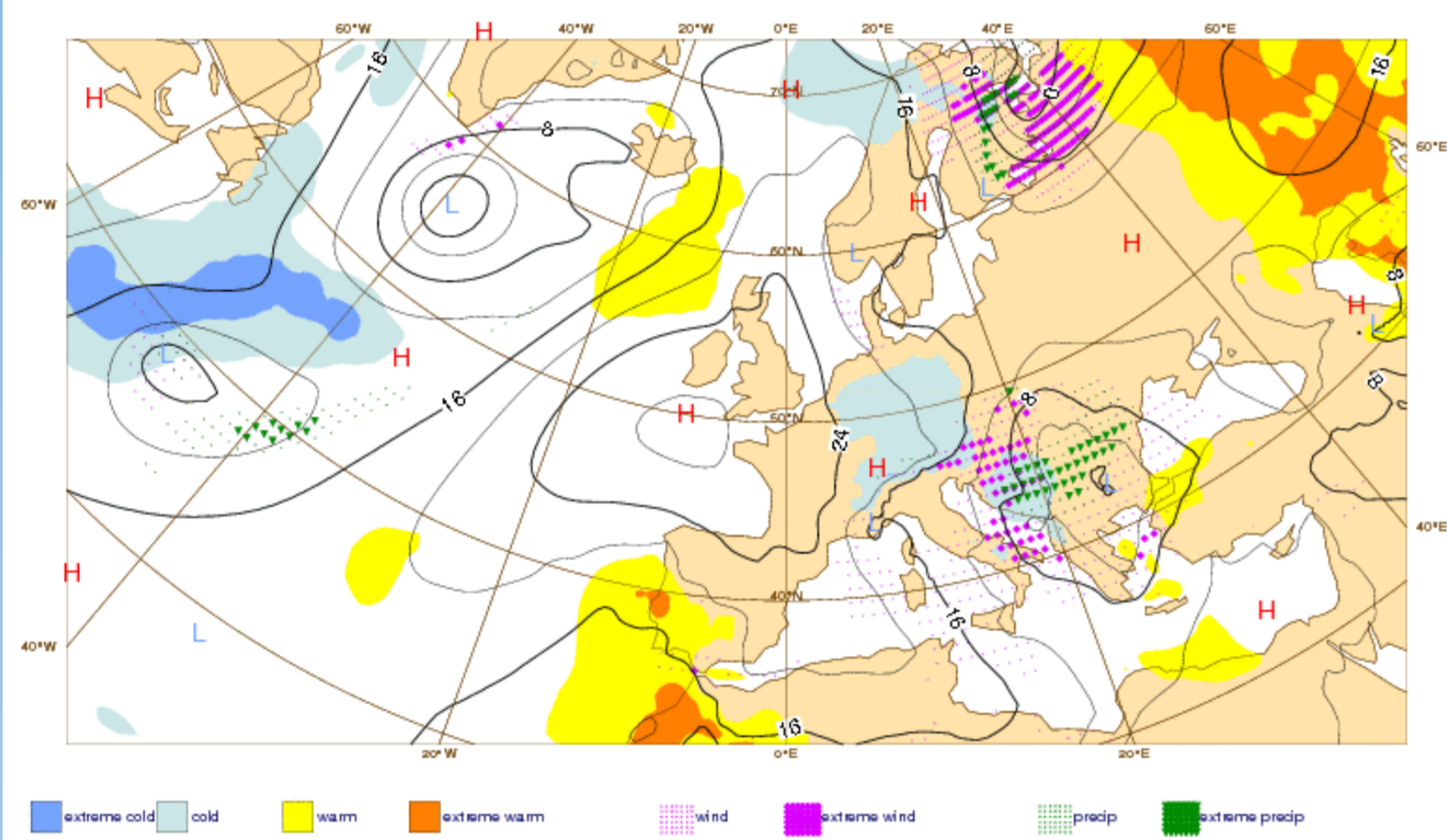
Republic Hydrometeorological Service of Serbia  
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## Introduction

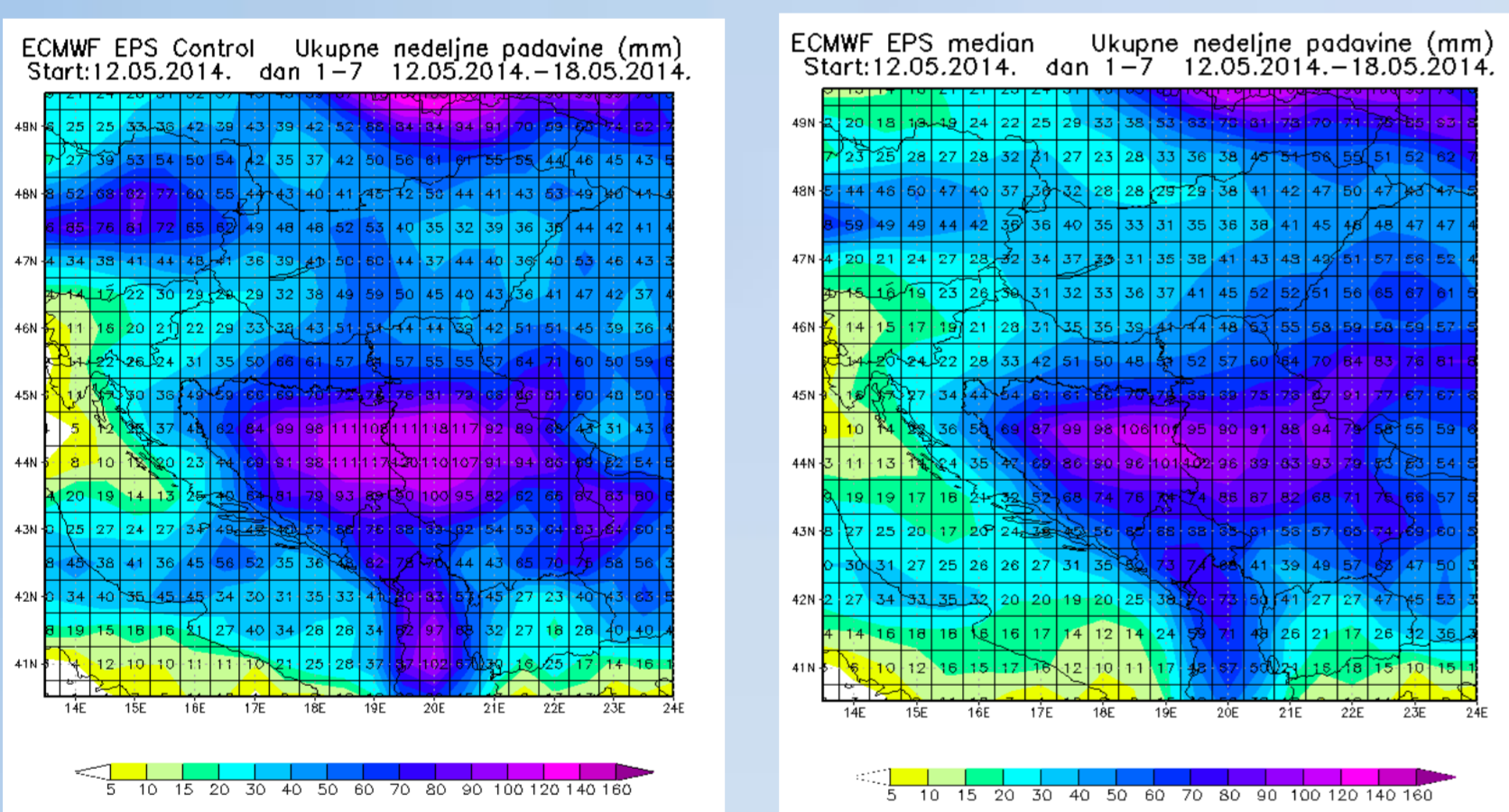
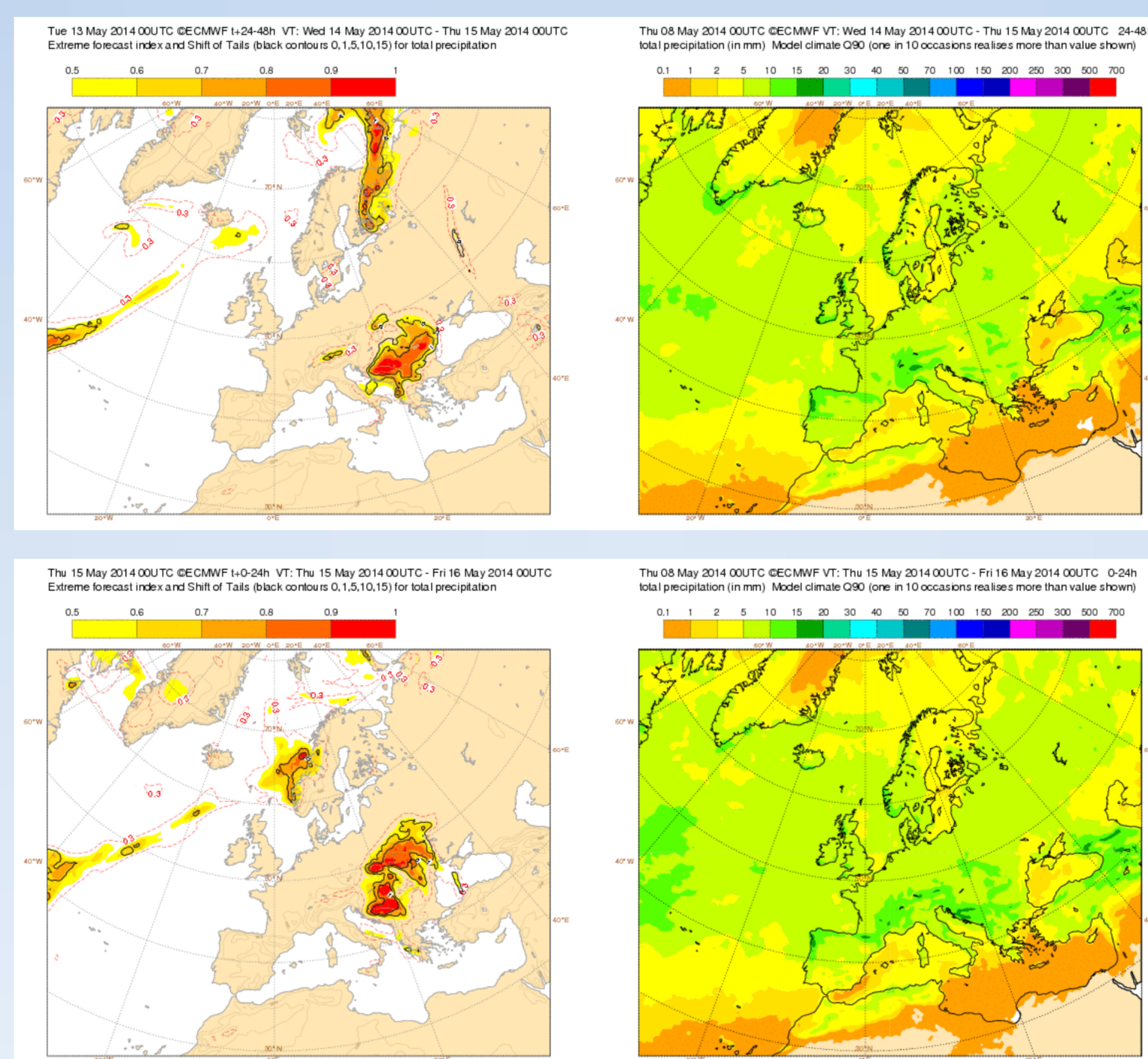
In the period from 13 to 18 May 2014, the central Balkans area was affected by a broad, developed Genoa cyclone that had accumulated a large amount of moisture and had an “unusual” trajectory, lingering over this territory for days. It caused heavy and long-lasting precipitation, especially in the period from 13 to 16 May, which surpassed many historical records, triggered catastrophic floods and caused human casualties and enormous material damage.



Anomalous weather predicted by EPS: Tuesday 13 May 2014 at 00 UTC  
1000 hPa Z ensemble mean (Wednesday 14 May 2014 at 12 UTC)  
and EFI values for Total precipitation, maximum 10m wind gust and mean 2m temperature (all 24h)  
valid for 24 hours from Wednesday 14 May 2014 at 00 UTC to Thursday 15 May 2014 at 00 UTC



## NWP Products-ECMWF

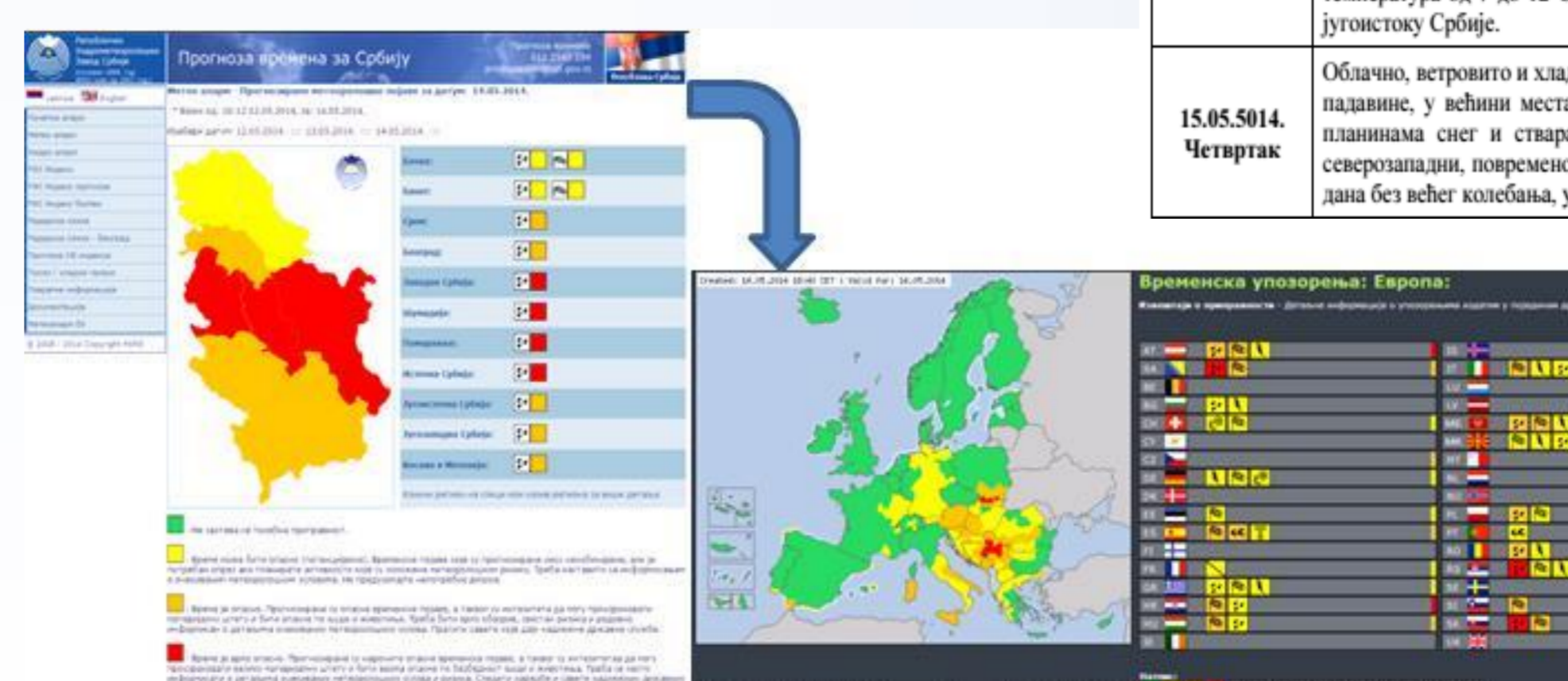
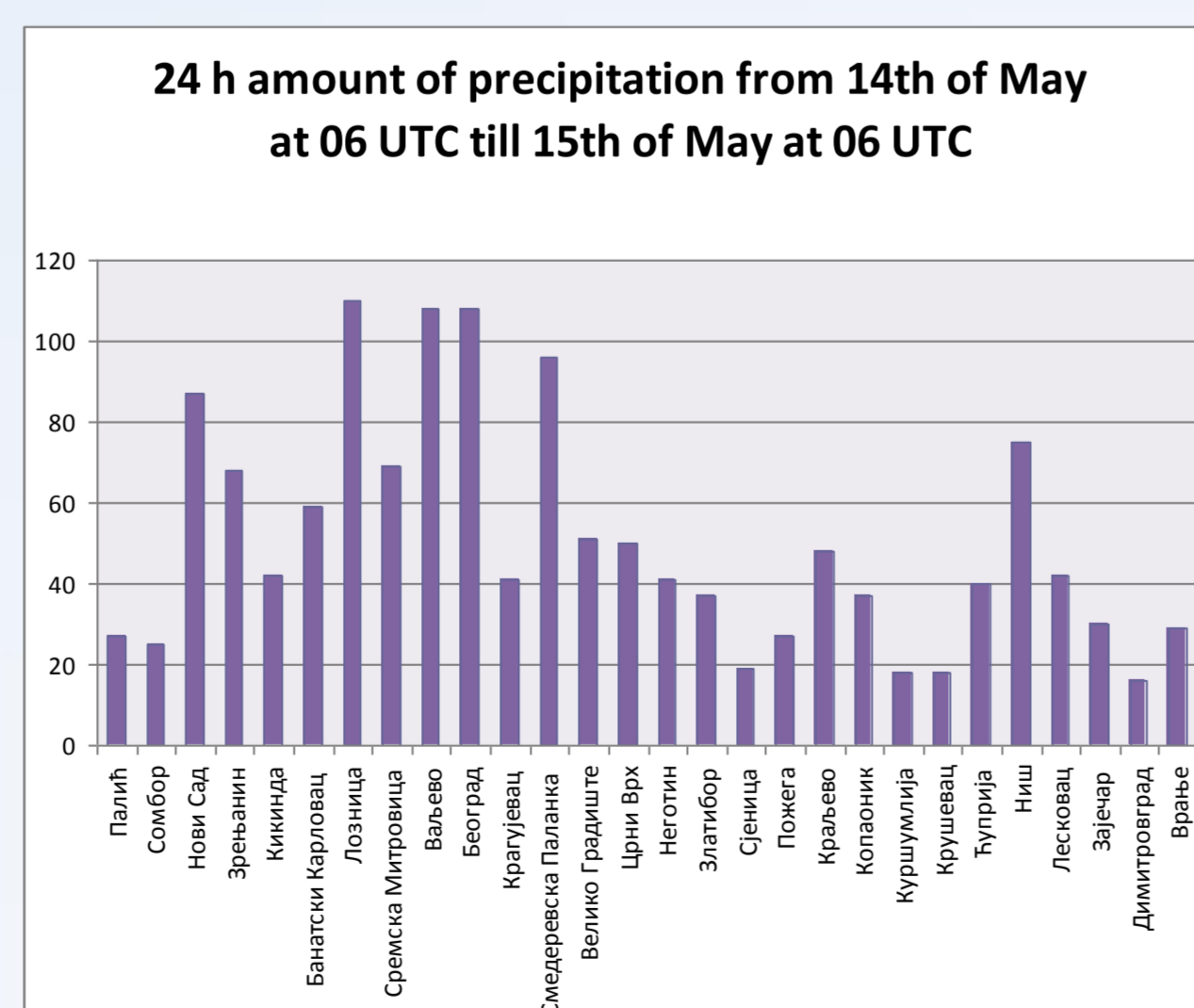
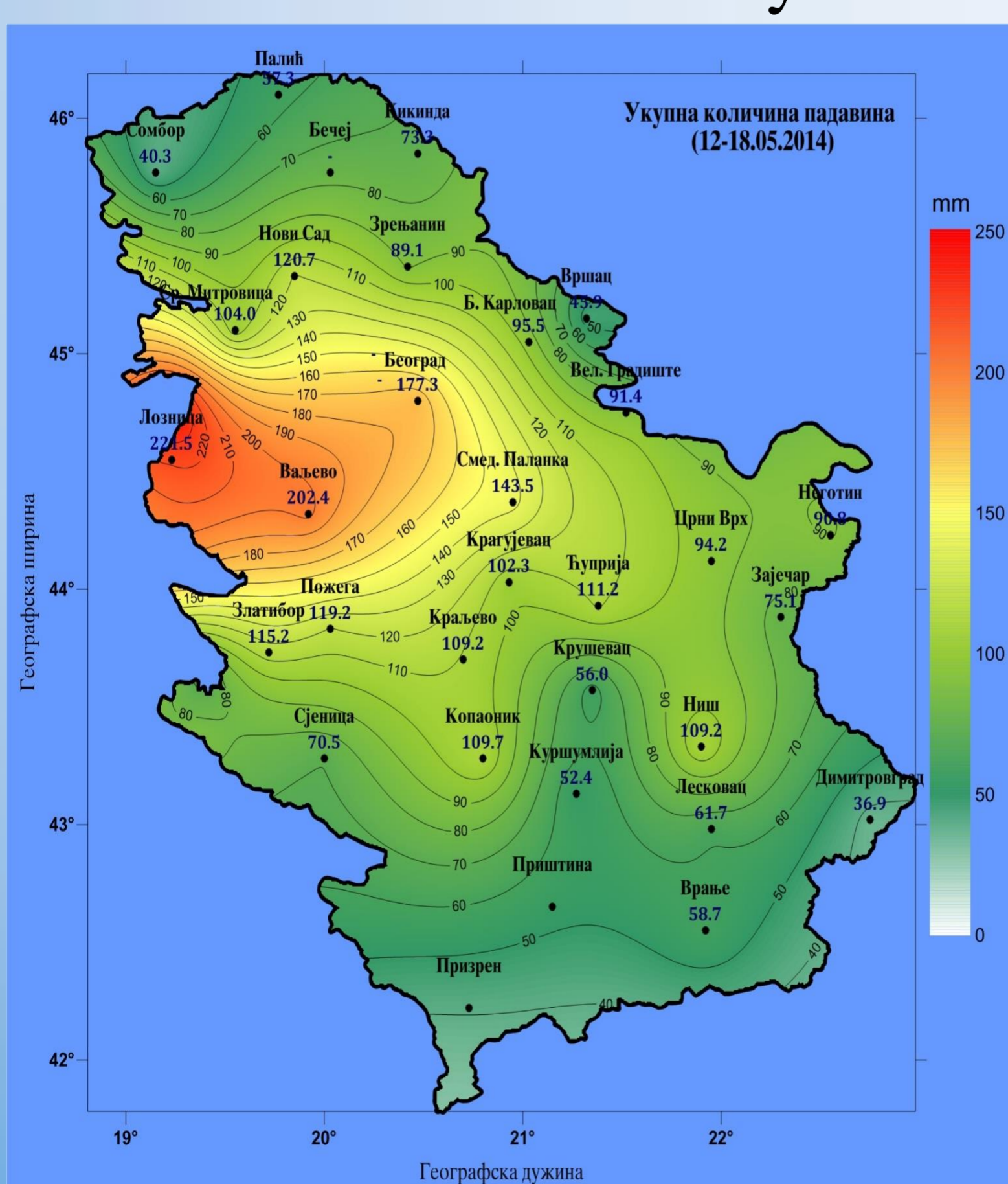


## Good quantification

Relying on numerical model products, including primarily ECMWF products, RHMS forecasted on time and with high certainty extreme precipitation quantities several days in advance, and confirmed day after day the inevitability of the events by permanently issuing warnings of extreme events with 90% probability of occurrence.

## Observation

Total amount of rain from 12<sup>th</sup> to 18<sup>th</sup> of May 2014



Prognoza vremena za područje Srbije sa upozorenjem i stepenom opasnosti			
Datum izdavanja: 12.05.2014. godine u 12:00			
Period važenja: od 12.05.2014. do 21.05.2014. godine			
Prognoza vremena, upozorenje i verovatnoća ostvarenja opasne pojave			
Datum	Tekst prognoze	Upozorenje	Verovat. (%)
12.05.2014. Ponedjeljak	Na severu i zapadu Srbije postepeno razvedranje. U ostalim krajevima pretežno oblačno, mestimicno s kišom i lokalnim pljuskovima uz mogućnost grmljavine. Vetar slab i umeren severozapadni, uvece i noću u skretanju na jugoistocni. Najniska temperatura od 15 do 20°C.	Локални плајукови грмљавина	60
13.05.2014. Уторак	Промесљано облачно и мало топлије. После подне, увече и ноћу повремено kiša, плајукови и грмљавина. Локално је могућа nesloga са градом, jakim ветром и običnim pljuskovima. Vetar slab i umeren, južni i jugoistocni, uvece i noću severozapadni. Najniska temperatura od 8 do 13°C, a najviša od 20 do 25°C.	Локални плајукови с грмљавинама и градом Кoličina padavina ≥ 20 l/m <sup>2</sup> u periodu od 3h	90
14.05.2014. Sreda	Облачно, ветровито и хладно с кишом и локалним pljuskovima, uz obilne padavine, u већини места од 30 до 50 l/m <sup>2</sup> , локално и више. Vetar umeren i jak, severozapadni, uvece i u току ноћи повремено олујни. Najniska temperatura od 7 do 12°C, a najviša od 10 na severozapadu do 18°C na jugoistoku Srbije.	Кoličina padavina ≥ 40 l/m <sup>2</sup> u periodu od 12 h Ударни ветри > 17 m/s	90
15.05.2014. Четвртак	Облачно, ветровито и хладно с кишом и локалним pljuskovima, uz obilne padavine, u већини места од 30 до 50 l/m <sup>2</sup> , локално и више. U вишим планинама sneg и stariše snegovi pokrивачa. Vetar umeren i jak, severozapadni, povremeno sa ударима олујне jačine. Temperatura u току дана без већег колебања, u већини места од 7 до 12°C.	Кoličina padavina ≥ 40 l/m <sup>2</sup> u periodu od 12 h Ударни ветри > 17 m/s	90