SEECOP activities 2018-9

G. Pejanovic
Republic Hydrometeorological Service of Serbia (RHMSS)

The 41st European Working Group on Limited-Area Modelling (EWGLAM) and
26th Short Range NWP (SRNWP)
Sofia, Bulgaria (30 September - 3 October 2019)

SEECOP (Current Membership)

- SEECOP Consortium Member Countries:
  - Albania
  - the Federation of Bosnia and Herzegovina (Bosnia and Herzegovina)
  - the Republic of Srpska (Bosnia and Herzegovina)
  - Republic of North Macedonia
  - Montenegro
  - Serbia
  - Ukraine

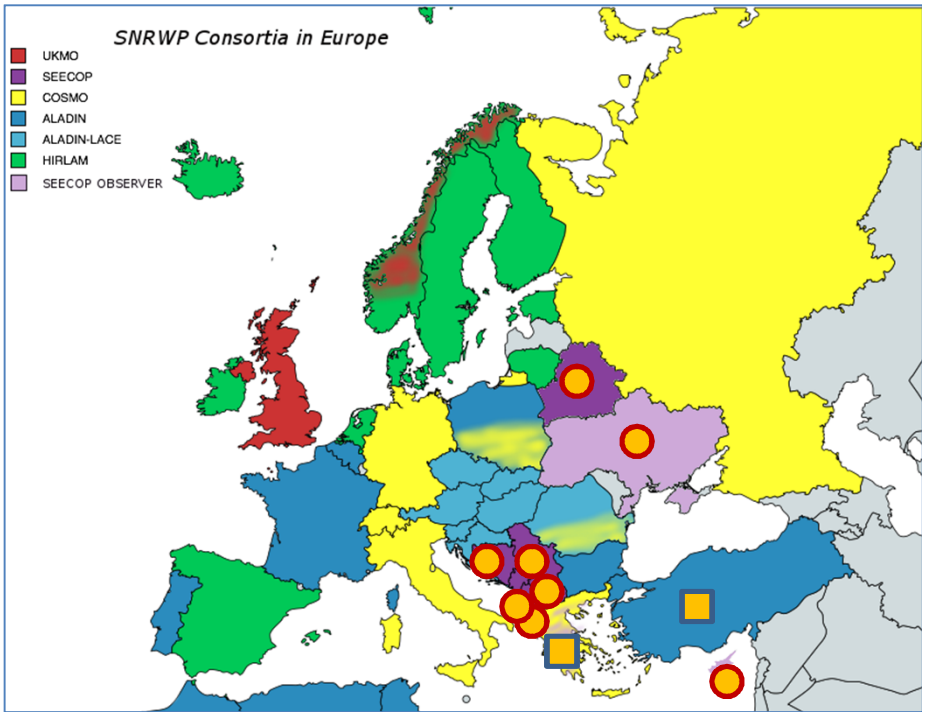
  - Belarus

  (membership approved; Agreement to be signed)

  - Cyprus

  (membership approved; Agreement to be signed)

- Observers (showed interest to collaborate)
  - Greece
  - Turkey



Consortium Principles

- **sharing resources** (expertise, data, modelling)
- **reducing overlaps** among the Members
- **training**
- **open for cooperation** with other consortia
- **open for** new memberships
- **self-funding**
- **model code repository** with the basic and developed programs
- **research** and **developments** focused on operational applications
- **consortium model:** NMMB (WRF-NMM)

Consortium management

- **Consortium Council (CC)**
  - composed of the Members' Directors
  - Annual meetings
  - Rotation principle for the CC Chair

- **Coordination Experts Team (CET)**
  - research/work plans

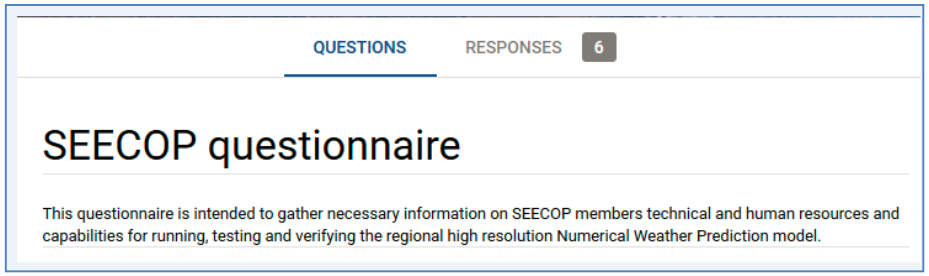
- **Working Groups (WGs)**
  - Data assimilation
  - Applications
  - System aspects
  - Validation

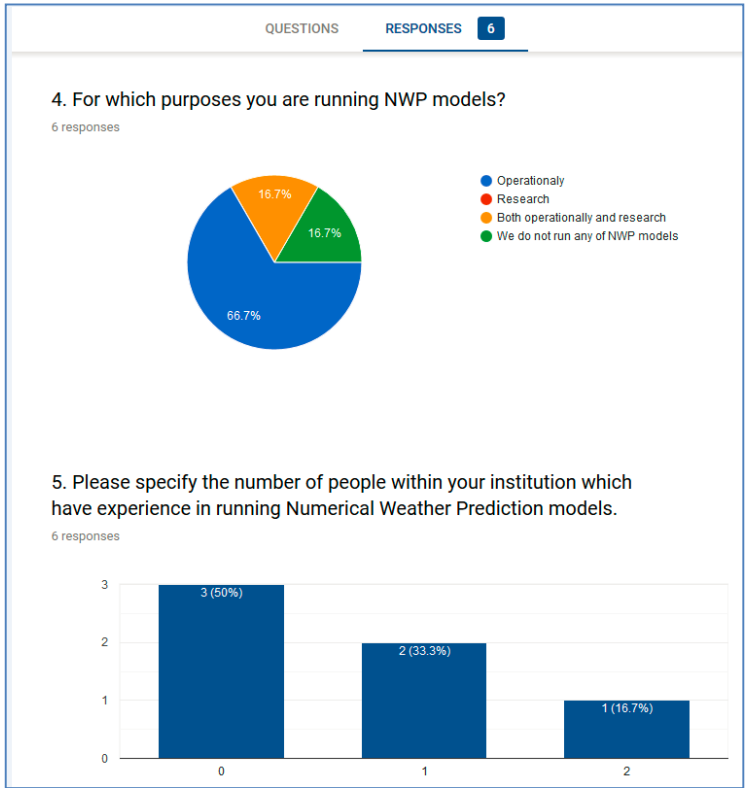
NMMB Model Training Workshop (Belgrade, Oct 2017)

- 1 week training
- Hands-on exercises
- Launching the model
- Written manual
- Zipped model code for participants

SEECOP questionnaire

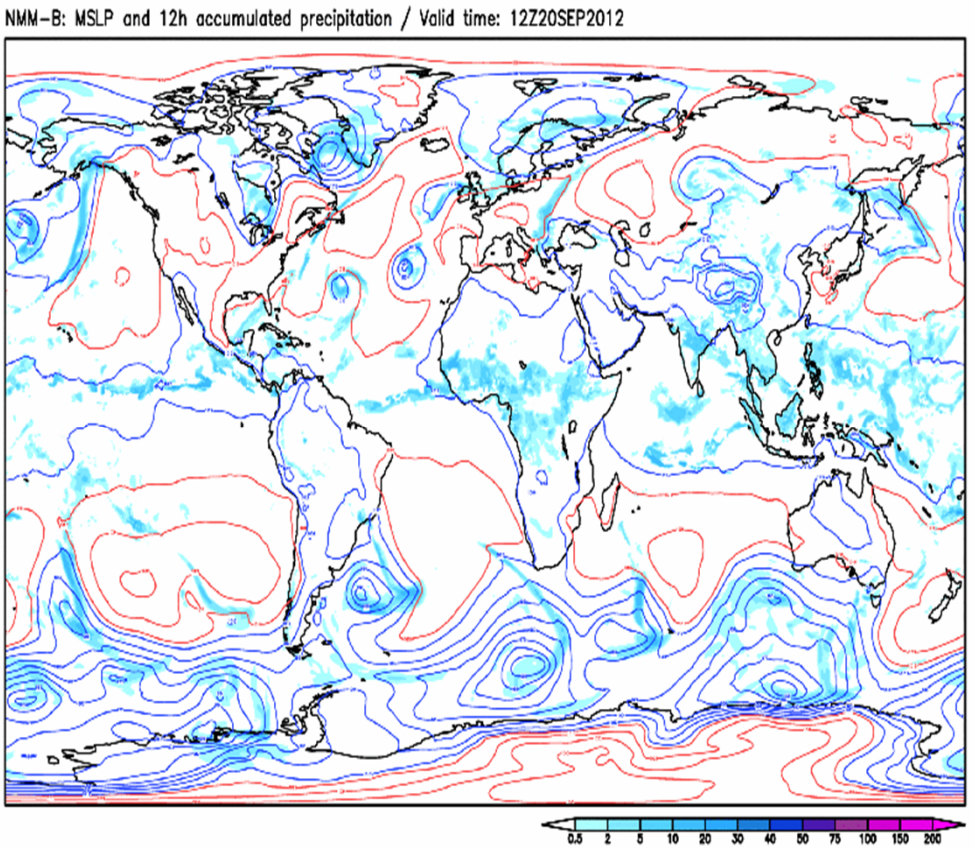
- A questionnaire on NWP activities and experiences of the consortium members circulated
- Analysis of the answers is currently in course
- Results of the analysis will be presented in the incoming SEECOP annual meeting in November 2019, followed with proposed actions in the next period





SEECOP NMMB global model setup

- Global domain
- Horizontal res 0.48 x 0.36 degrees
- Vertical res 64 levels
- 10 days forecast
- Initial conditions from GFS

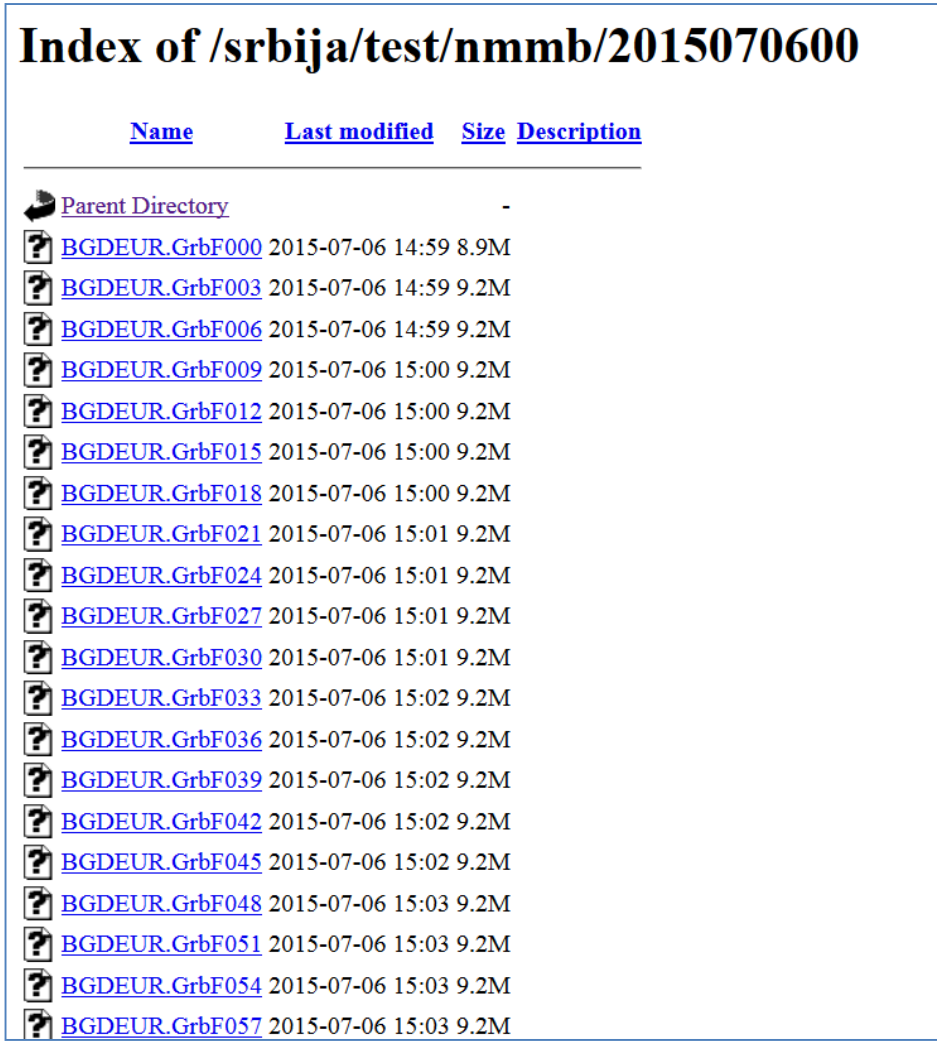


SEECOP global NMMB product dissemination

- uploading global NMMB forecast parameters to other SEECOP members
  (Serbian HMS) → (Montengro HMS)

- SEECOP web site in development (Montenegro HMS)

http://seecop.meteo.co.me



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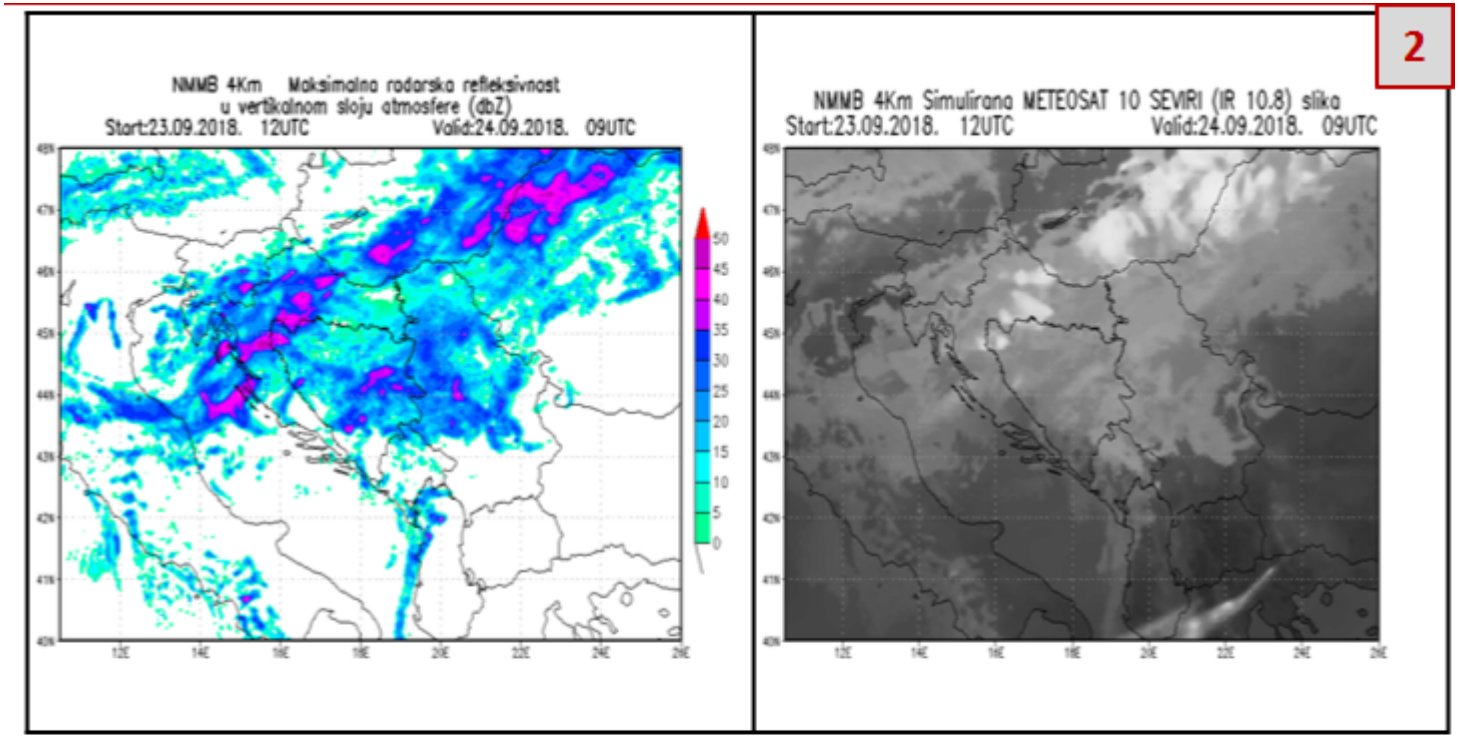
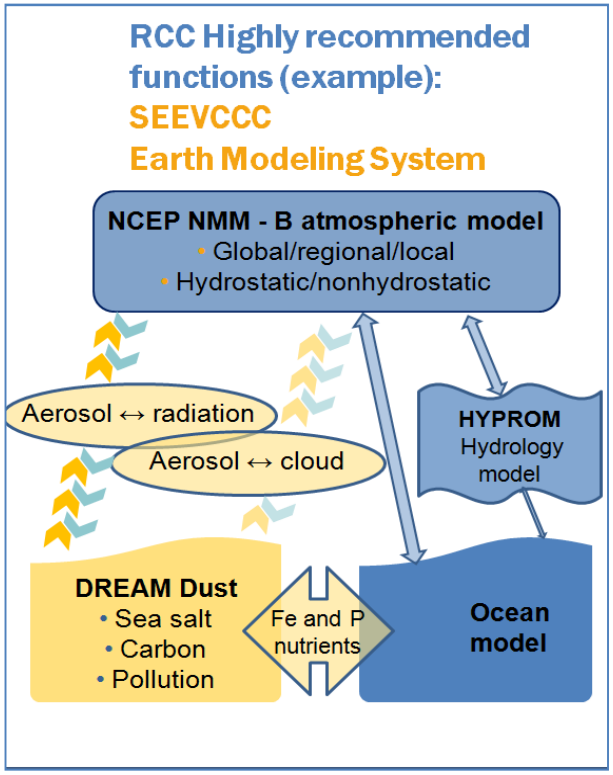


Since January 2018 regional NMMB model became time critical application option 2 at ECMW.

- LBC IFS HIRES ECMWF
- Operational suite: 2 times per day 06 UTC and 18UTC
- Forecast duration: 72hrs
- Horizontal resolution: 4km
- Number of vertical levels: 64
- CPU: 36 preprocessing/postprocessing, 252 model

- **SEECOP Earth Model System (EMS) concept**
  - NMMB used as an atmospheric driver of other Earth systems
  - Deveoping feedback mechanisms between different Earth systems: atmosphere, aerosol, hydrology, ocean, etc

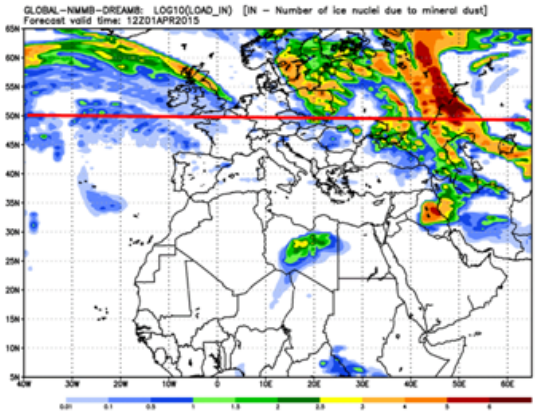


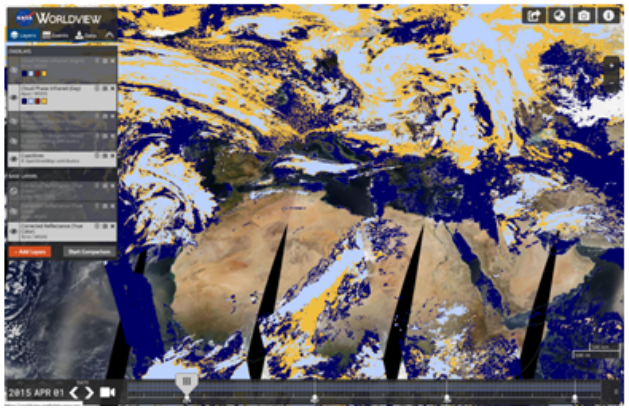
Ongoing ECMWF Special Project
Mineral Aerosol Impacts to Sub-seasonal to Seasonal Predictability

Global NMMB-DREAM (dust) model has been developed

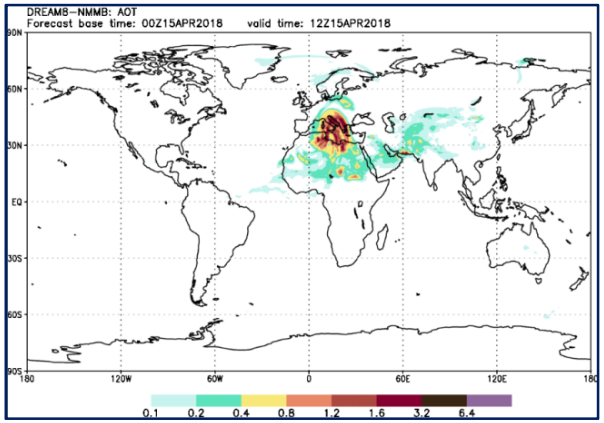
Objective:

to investigate the impact of aerosol direct and indirect effects on NWP using the coupled system of global NMMB and dust DREAM model.



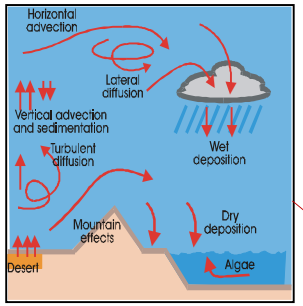


Left: predict ice nuclei due to dust
Right: MSG SEVIRI ice water path



Example of the global dust forecast performed by the NMMB-DREAM model

Ice Nucleation due to minera dust: ‘Cooking’ cold clouds - our recipe



DREAM model

NMMB model

Dust C

T, RH

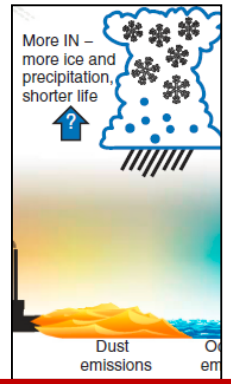
DeMott (2015) [-35°C <T<-5°C]

$$n_{IN} = C(n_{dust})^{(\alpha(273.16-T)+\beta)} \exp^{(\gamma(273.16-T)+\delta)}$$

Steinke et al (2015) [-55°C <T<-35°C]

$$n_{IN} = S_{dust} 1.88 \cdot 10^5 e^{-pT+q(RH_{ice}-100\%)}$$

n_{IN}



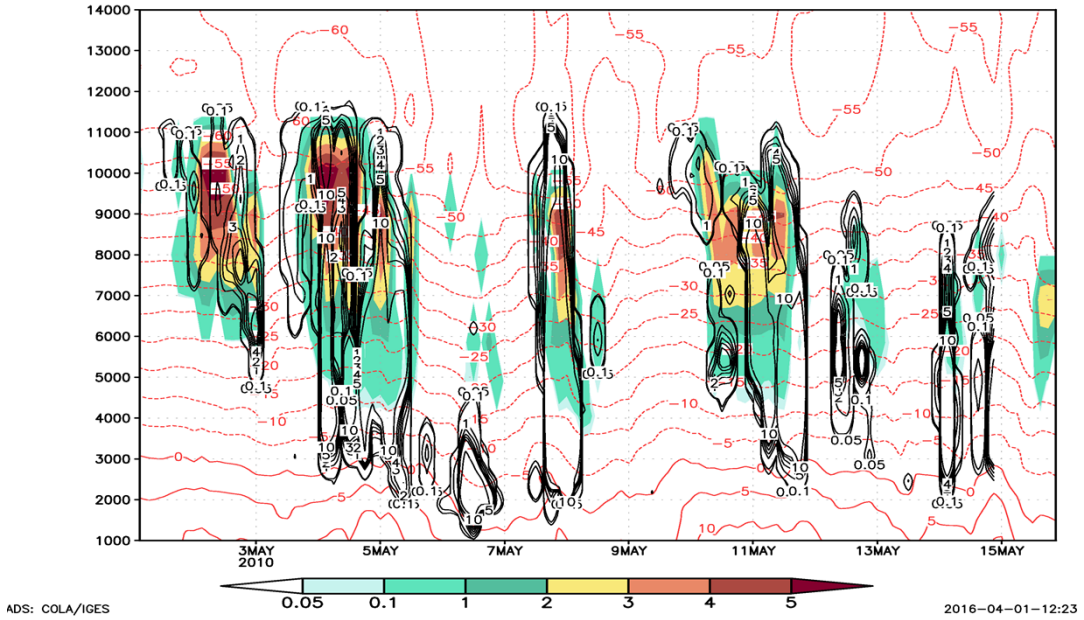
NMMB Thompson dust-friendly cold cloud micrphysics

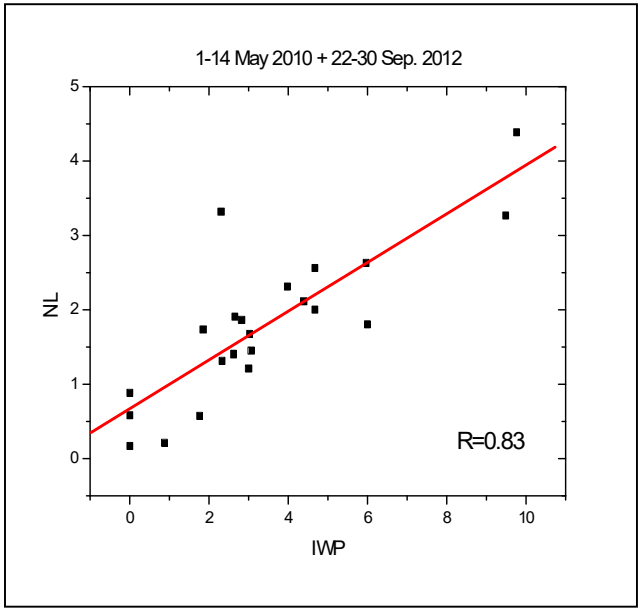
Nickovic et al, 2016, Atmos. Chem. Phys., 16, 11367–11378

Validating #IN parameterization

- **Model runs:** May 2010 and Sep 2012

Model vs. Cloud radar/lidar Ice Water Content (IWC) observations (Potenza)



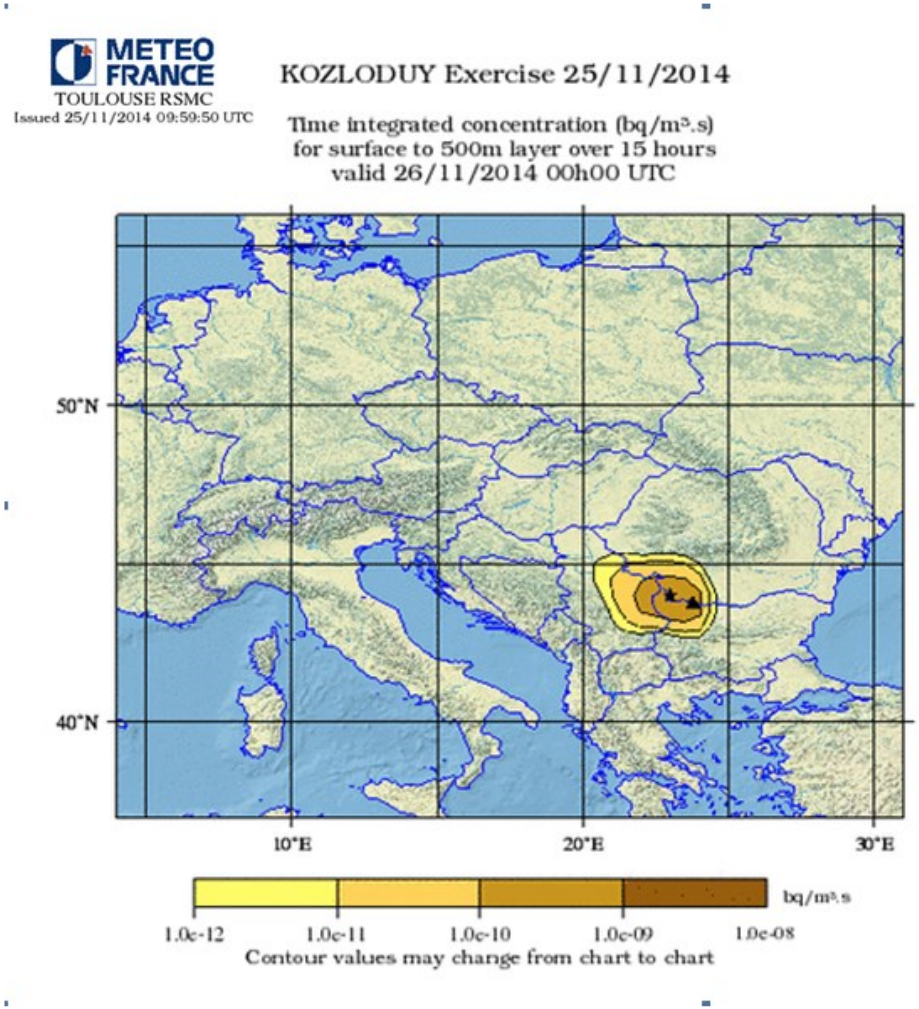


Nickovic et al, 2016, Atmos. Chem. Phys., 16, 11367–11378

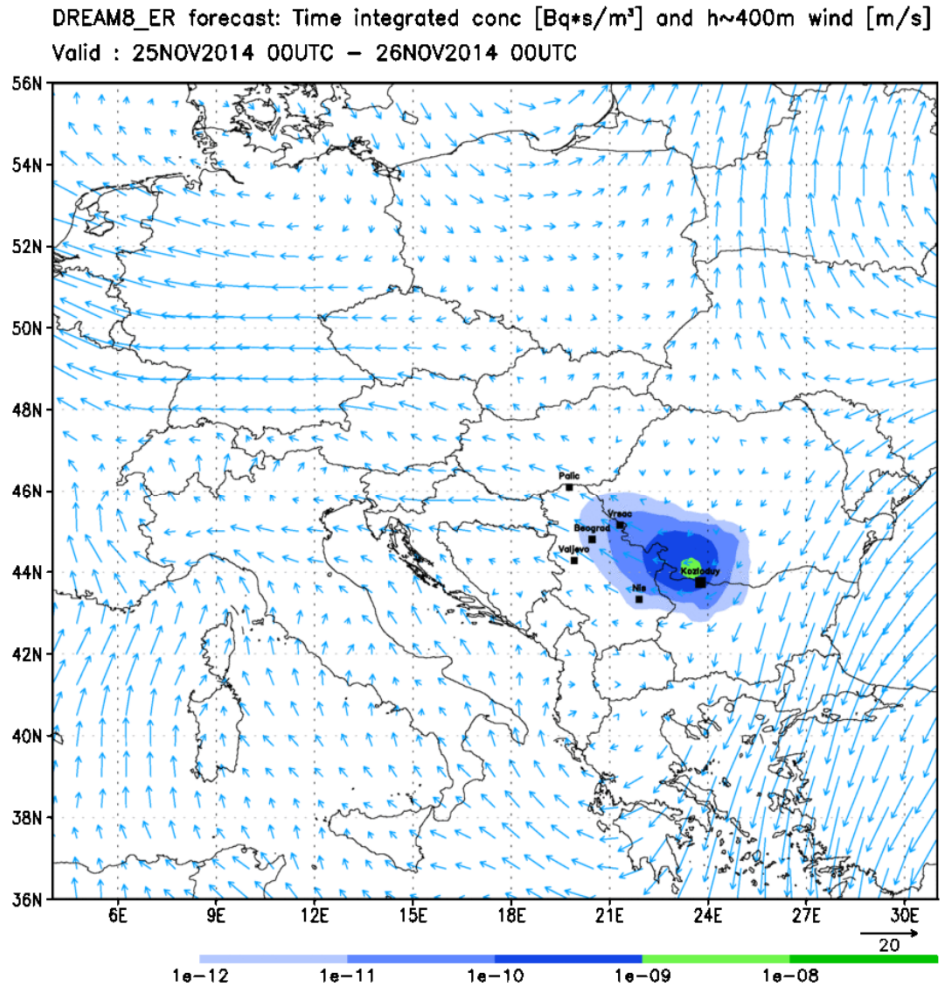
WMO/IAEA excercise:

Time-integrated of radio-nucleide concentration, Kozloduj 25-26 Nov 2014

MeteoFrance experiment

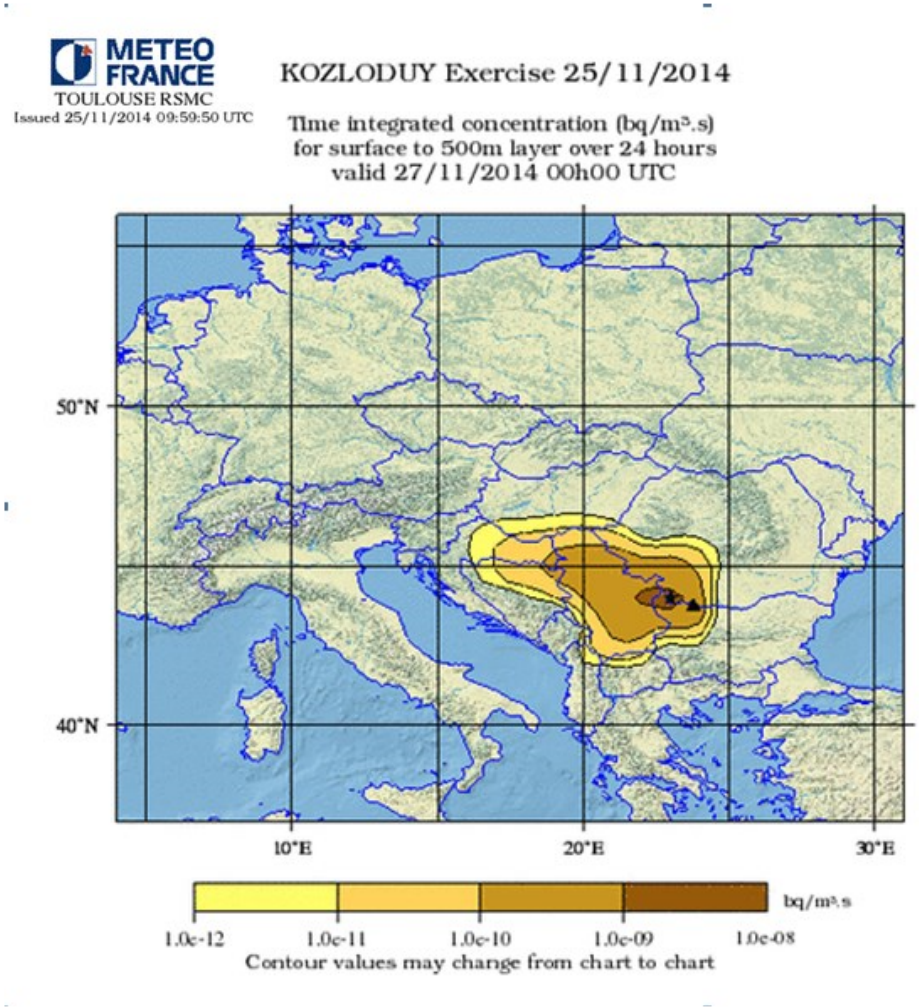


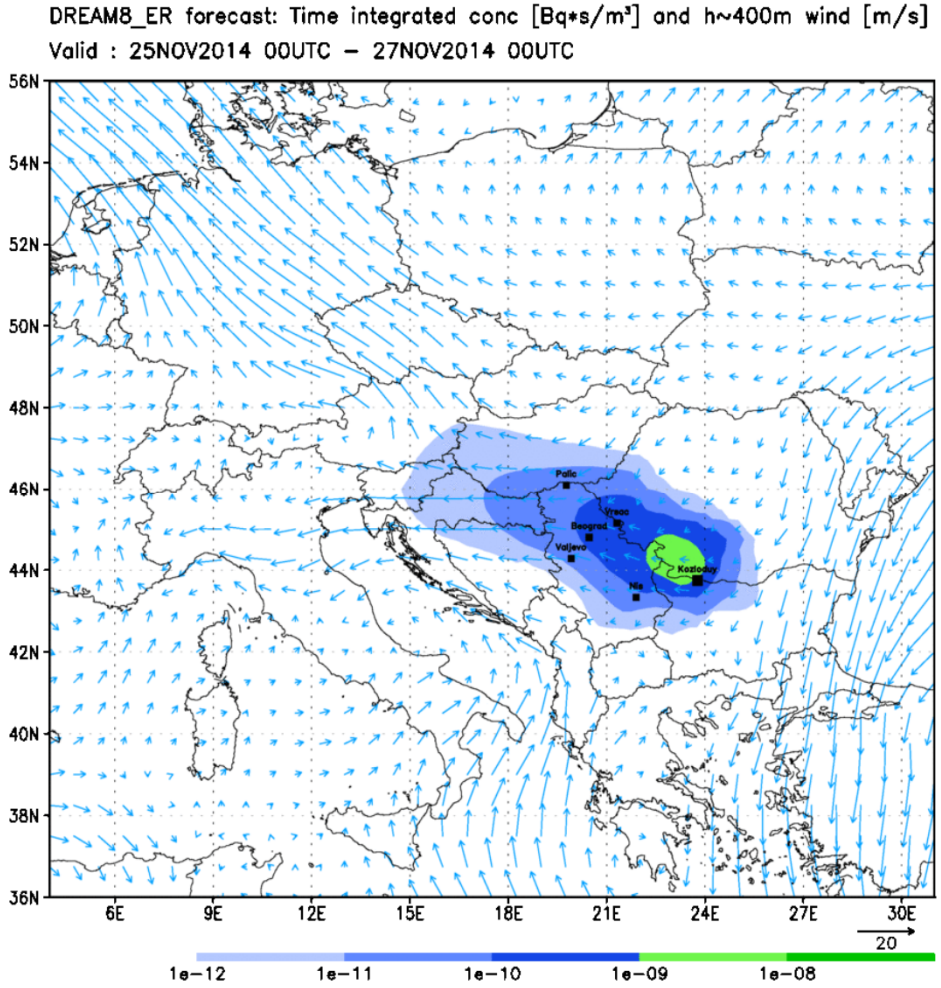
NMM-DREAM experiment



Vremenski integrisana koncentracija, Kozloduj

od 25. 11.2014. 00UTC do 27.11.2014. 00UTC





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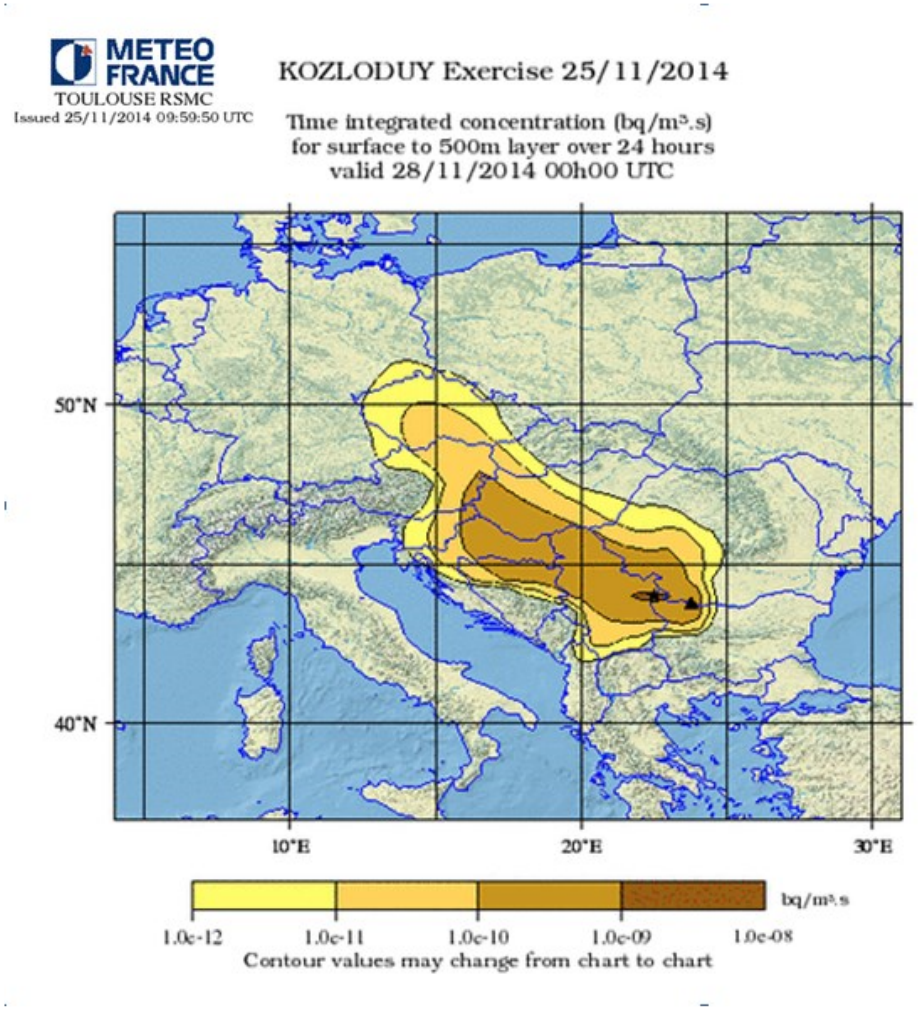

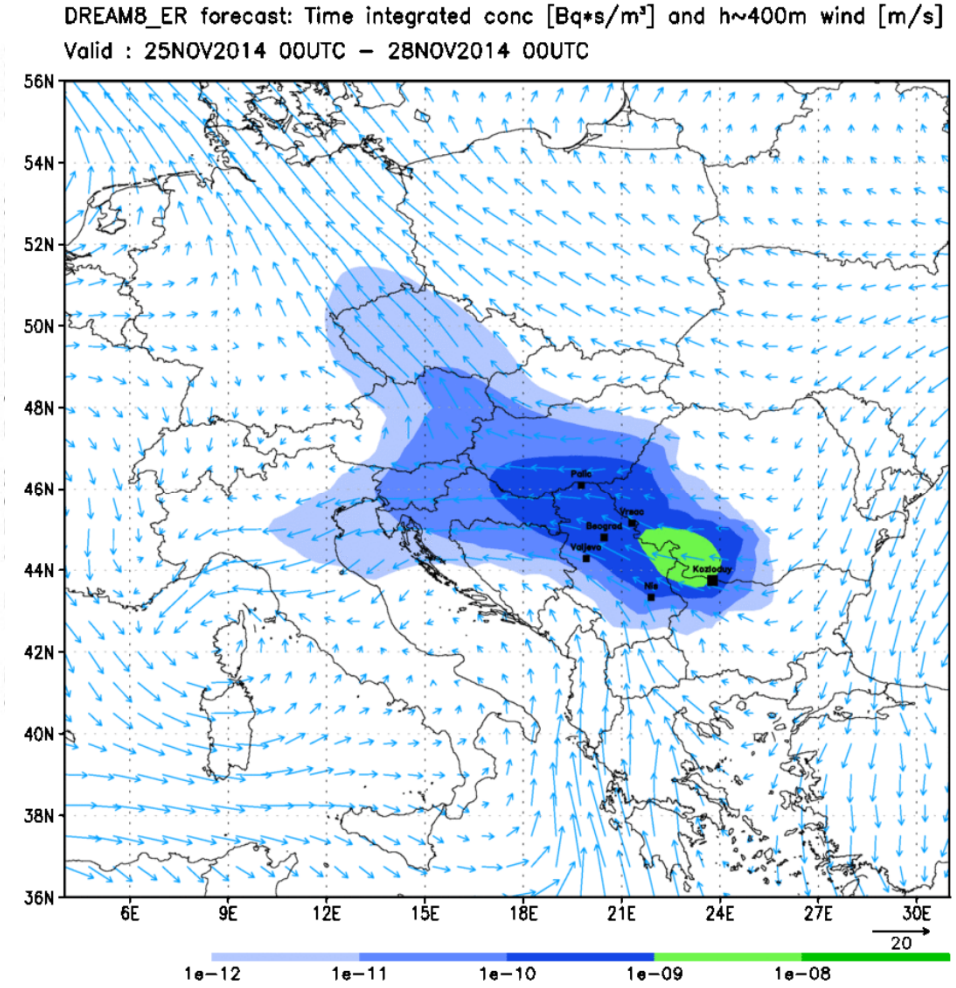

Ukupna depozicija, Kozloduj

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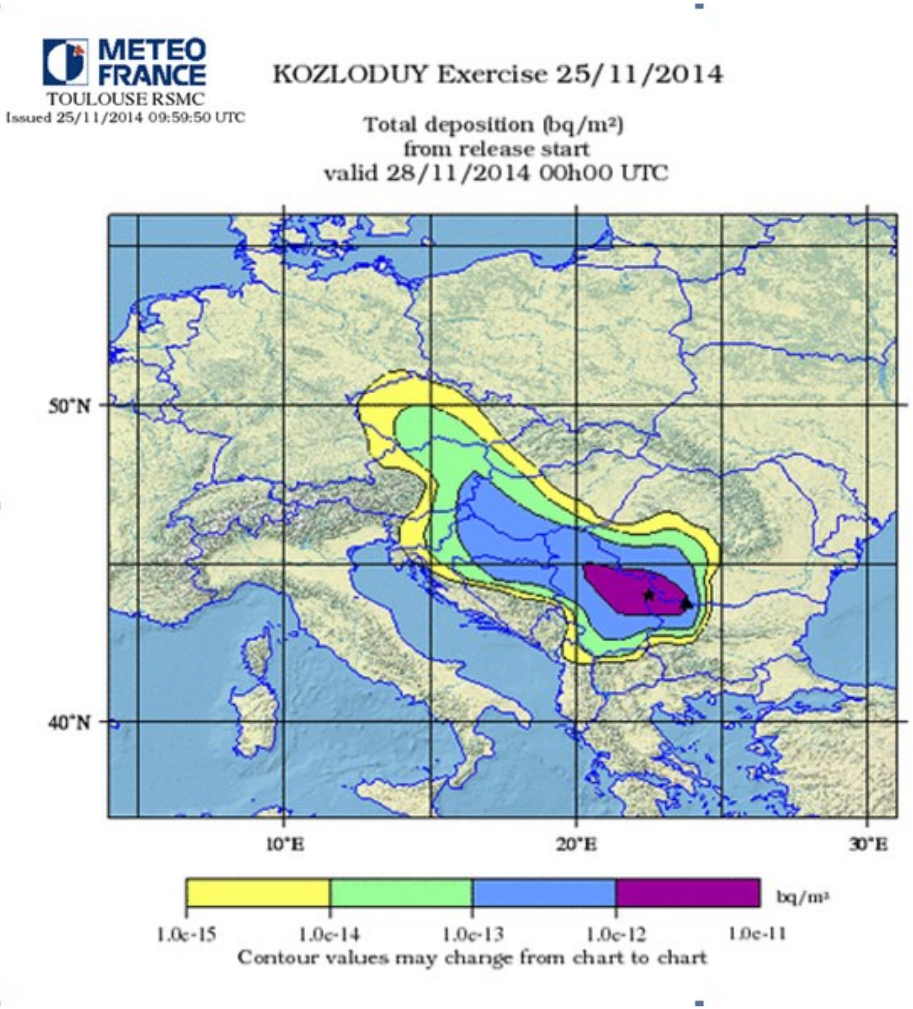
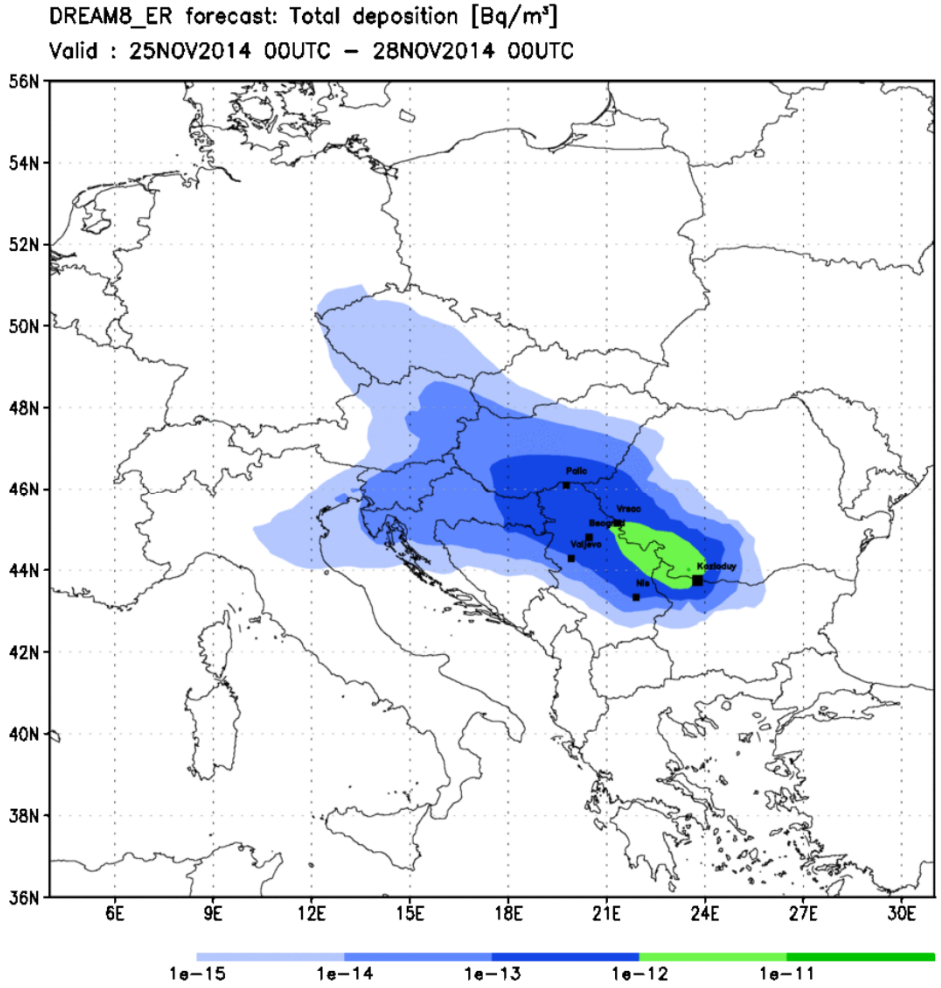
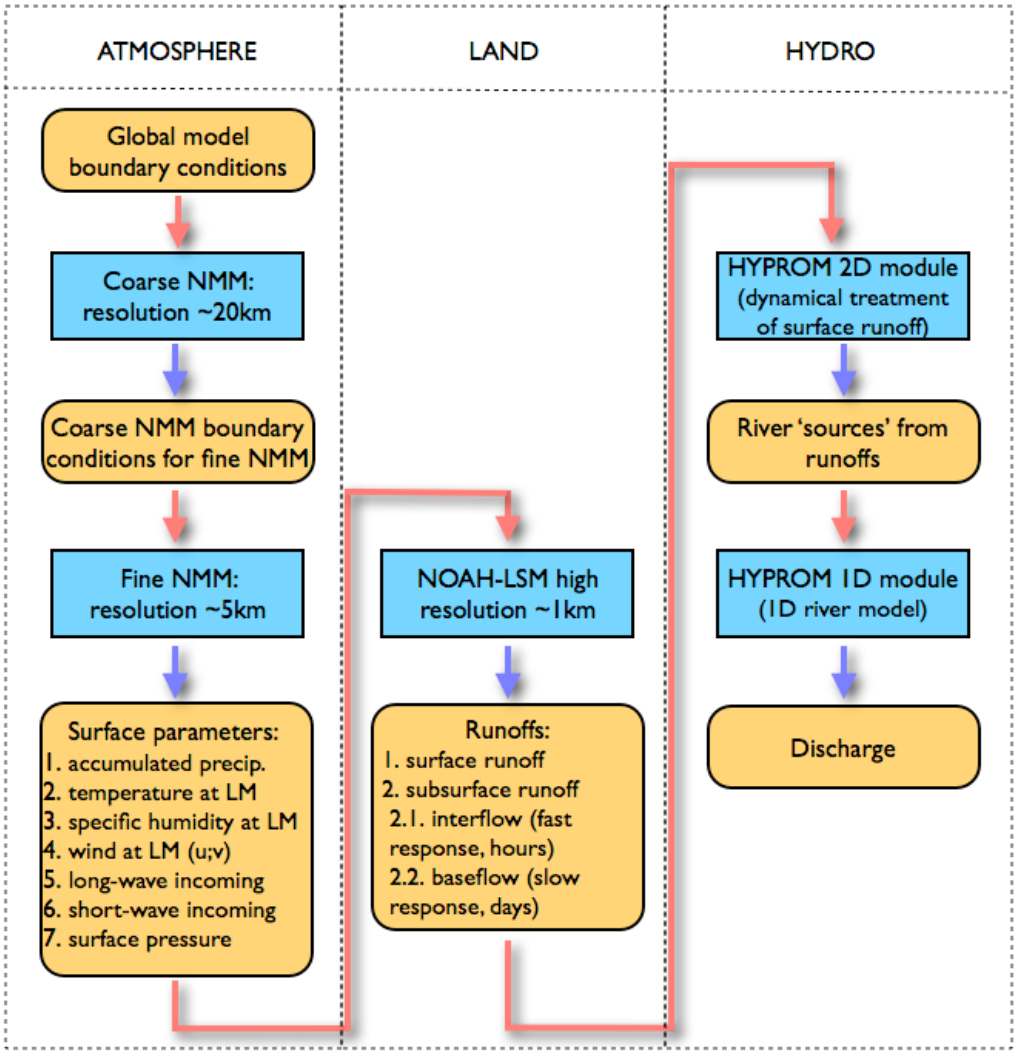
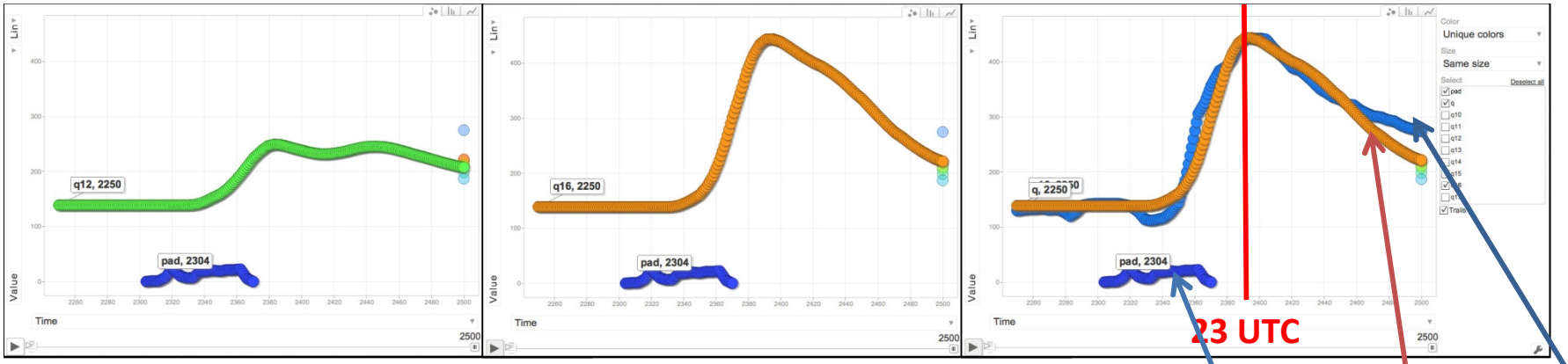




HYPROM integrated with the NCEP/NMM atmospheric model



LM - lowest atmospheric model level



12UTC 14UTC 16UTC

Observed Q

Predicted Q

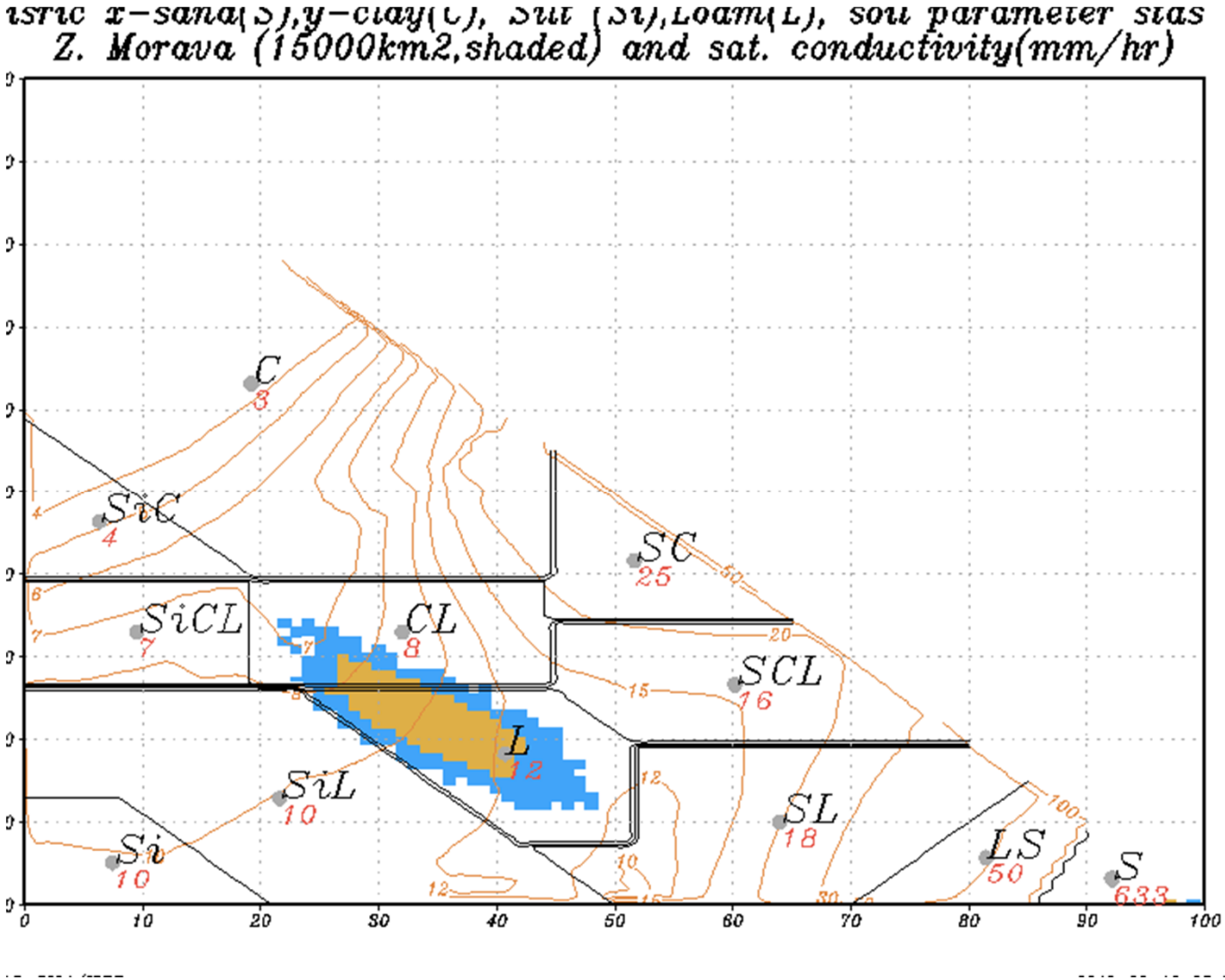
Radar P

S. Morava River flash flood case
23 Jan 2015
disasterous consequences

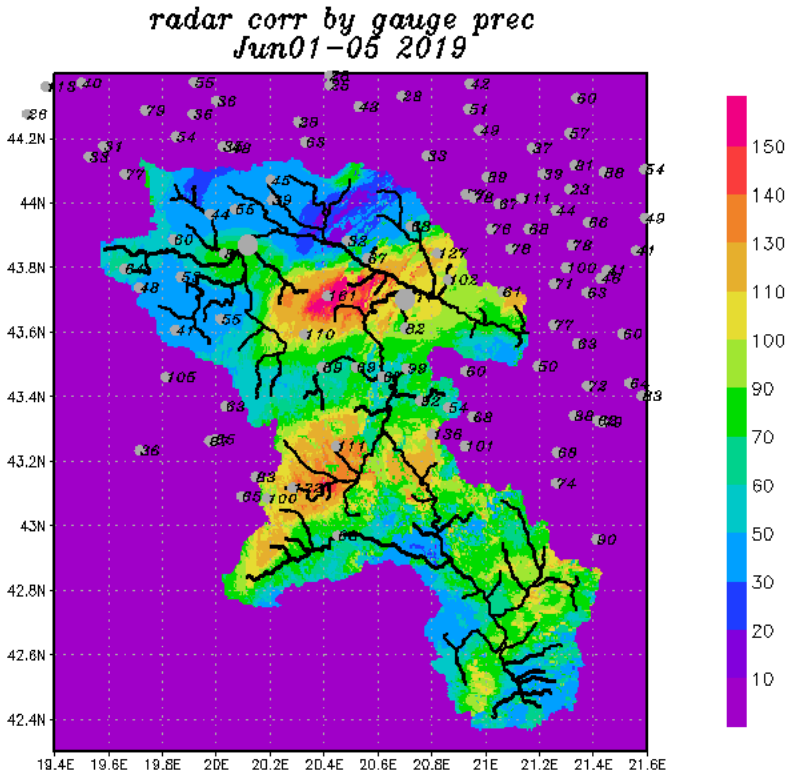
HYPROM run
Driven by radar precipitation

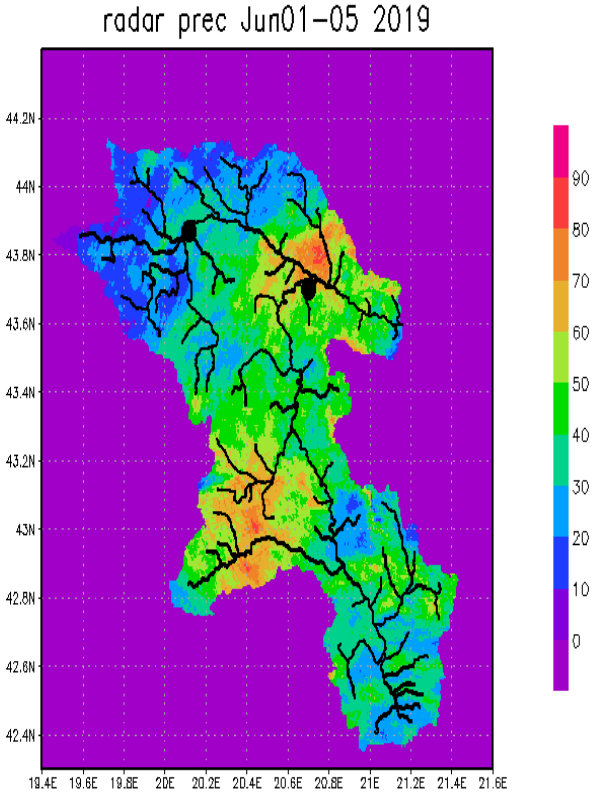
Predicted correctly the max discharge 7 hours in advance

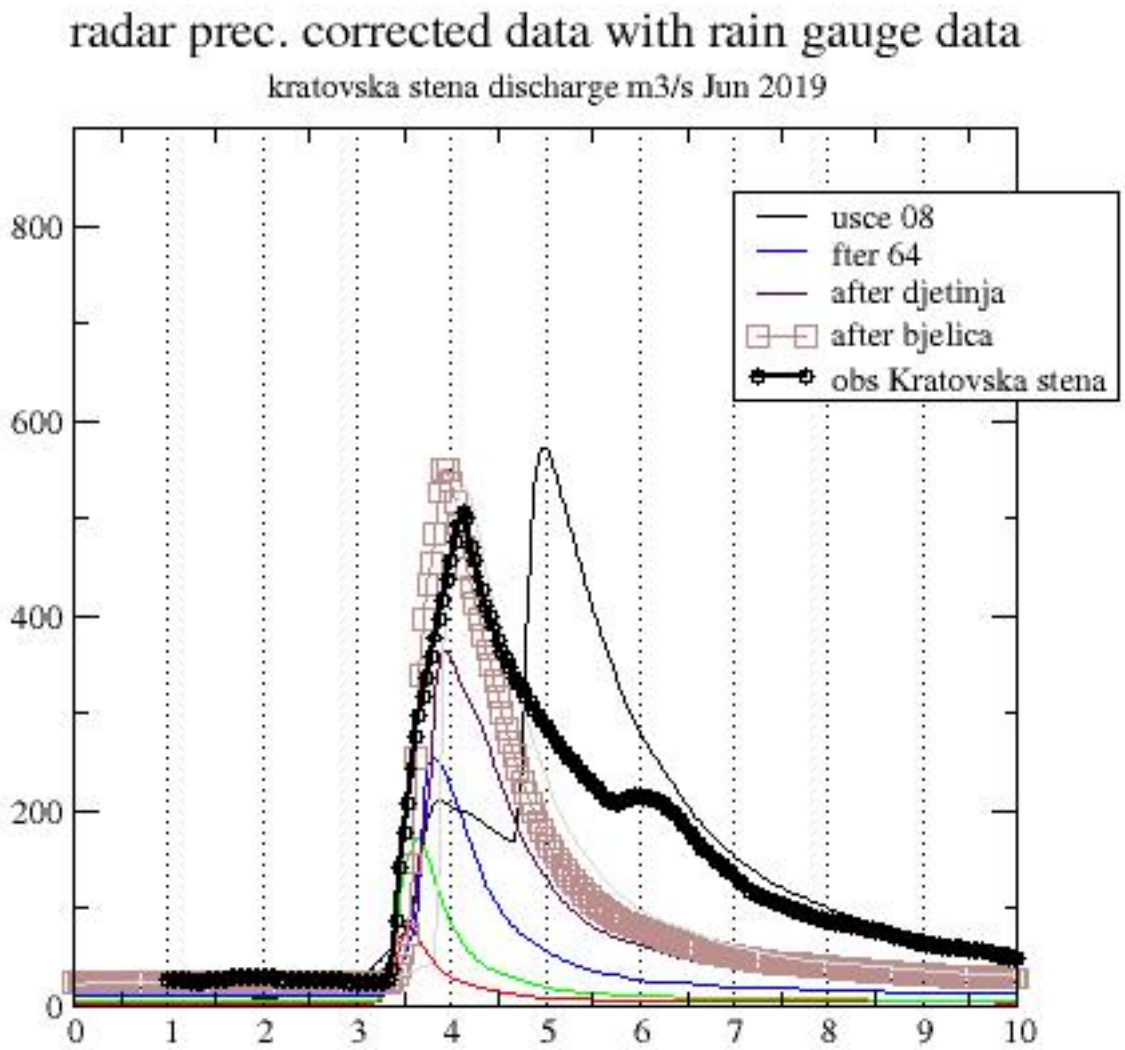
Soil data - ISRIC and West Morava basin 14000m2



Precipitation
Rain gauge and Radar Jastrebac data






radar prec. corrected data with rain gauge data
kratovska stena discharge m3/s Jun 2019
usce 08
fter 64
after djetinja
after bjelica
obs Kratovska stena
800
600
400
200
0
0
1
2
3
4
5
6
7
8
9
10