



REPUBLIC OF SLOVENIA
MINISTRY OF THE ENVIRONMENT AND SPATIAL PLANNING
SLOVENIAN ENVIRONMENT AGENCY

OPERATIONAL FLASH FLOOD FORECASTING AND EARLY WARNING AT THE SLOVENIAN ENVIRONMENT AGENCY (ARSO)

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SLOVENIAN ENVIRONMENT AGENCY (ARSO)

Body of the Ministry for the Environment and Spatial Planning

100% governmental institution, 5 Offices

The principle tasks of the Meteorological and Hydrological Offices:

Continuous monitoring, analyzing and forecasting of weather and hydrological conditions of rivers and the sea in Slovenia

Issuing warnings on extreme/dangerous weather, weather related and hydrological phenomena

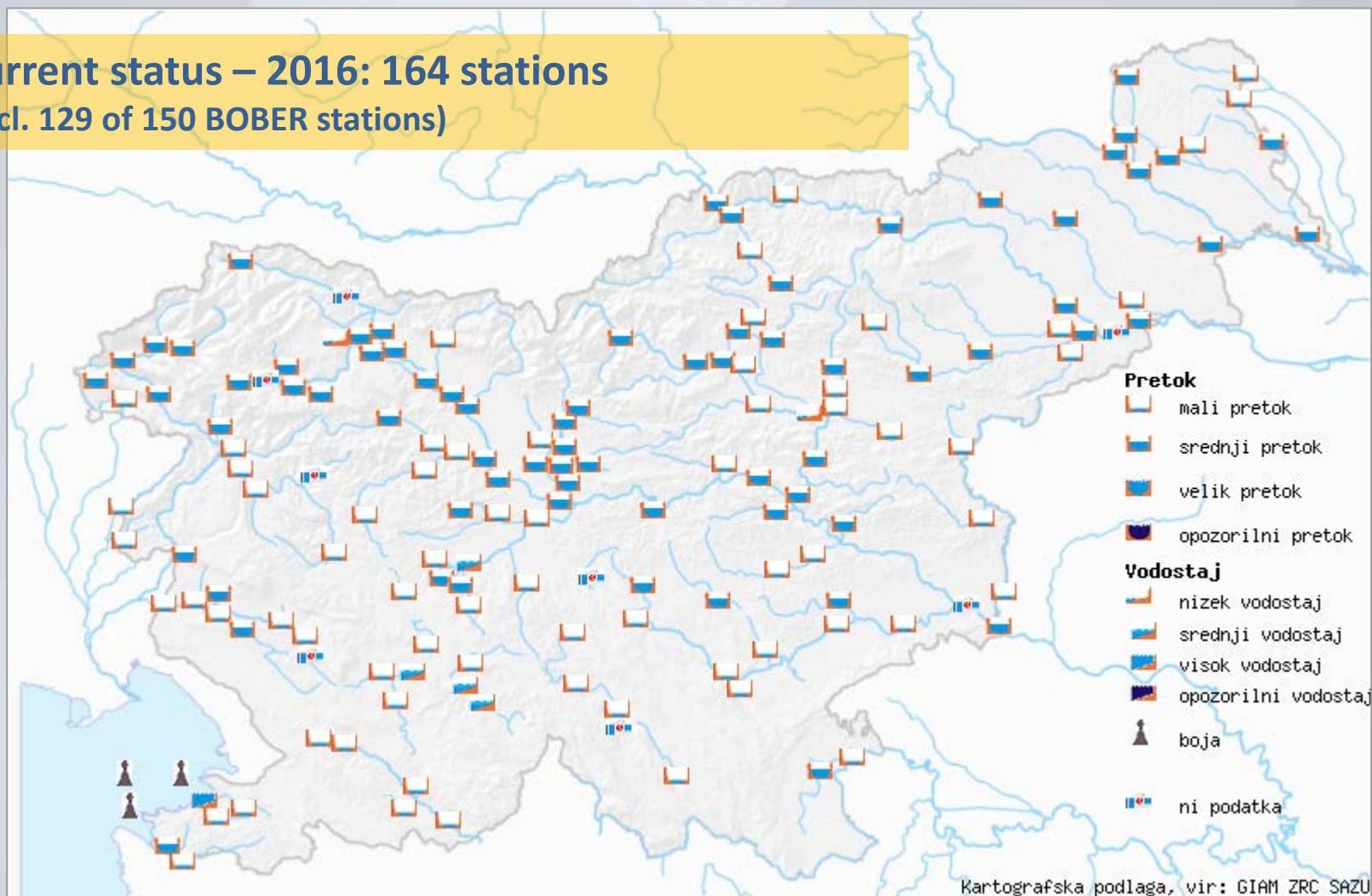
METEOROLOGICAL and HYDROLOGICAL FORECASTING

Integrated hydro-meteorological activities:

- 24/7 meteorological and hydrological service (on call)
- daily consultations at specified hours (9:00 and 13:00)
- common operation and communication strategies in emergency situations
- harmonized warning levels for intensive rainfall and flood hazard – coloured warnings
- meteorological data and forecasts available for hydrological forecasting through common database and local network

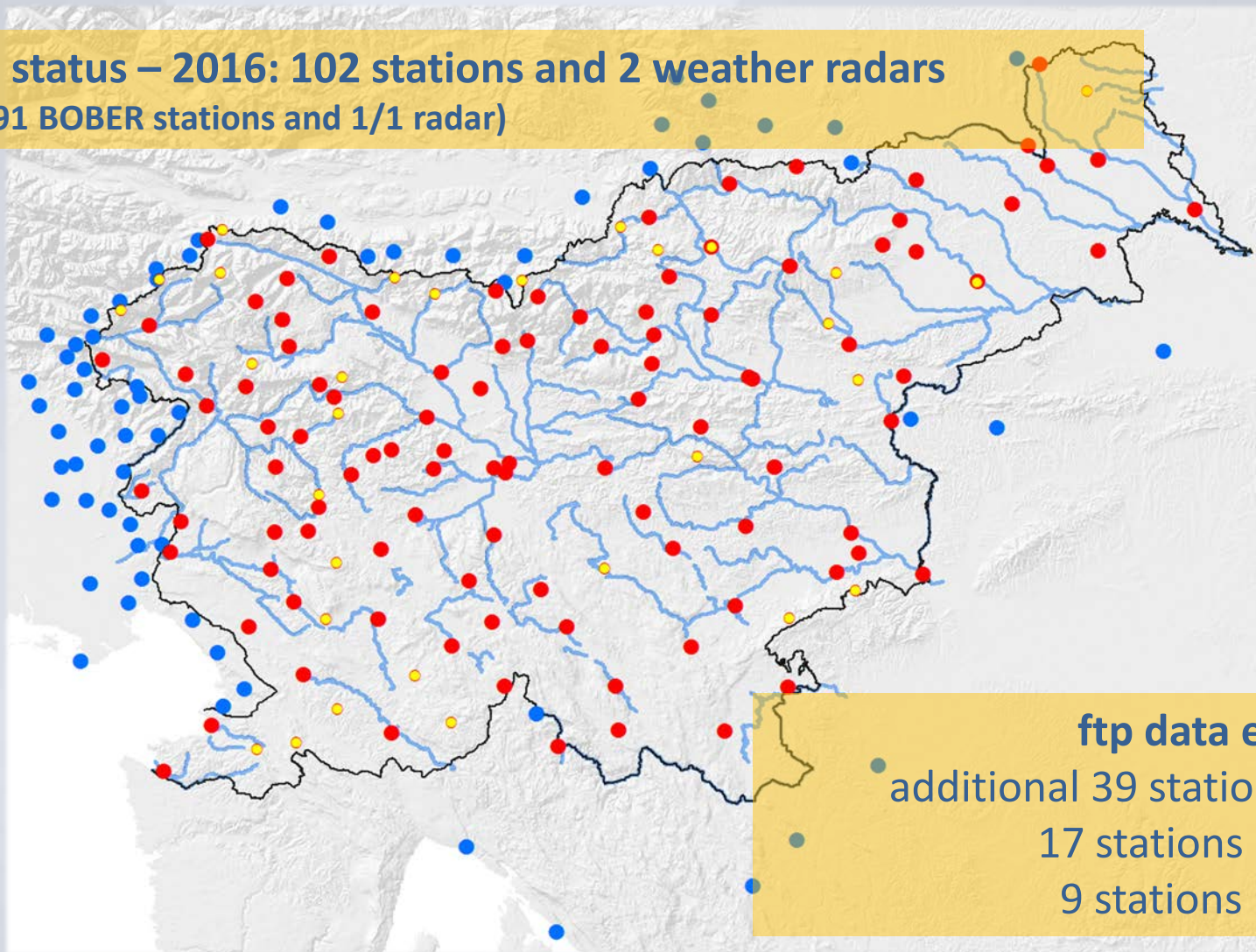
HYDROLOGICAL OBSERVATIONS IN REAL-TIME

Current status – 2016: 164 stations
(incl. 129 of 150 BOBER stations)



PRECIPITATION OBSERVATIONS IN REAL-TIME

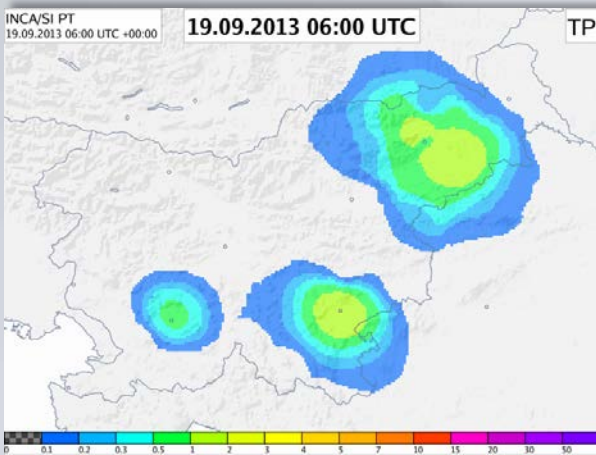
Current status – 2016: 102 stations and 2 weather radars
(incl. 61/91 BOBER stations and 1/1 radar)



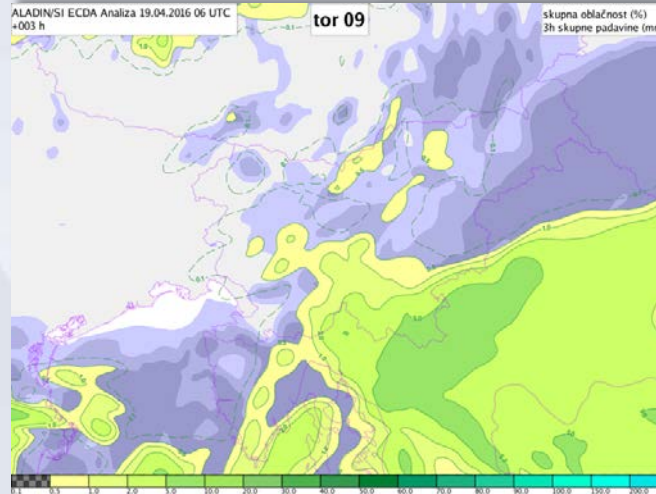
ftp data exchange:
additional 39 stations in Italy
17 stations in Austria
9 stations in Croatia

INCA AND NWP MODELS

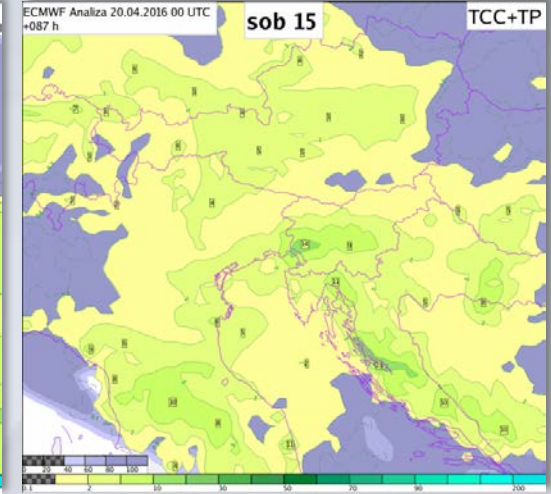
INCA-CE (up to +12h)



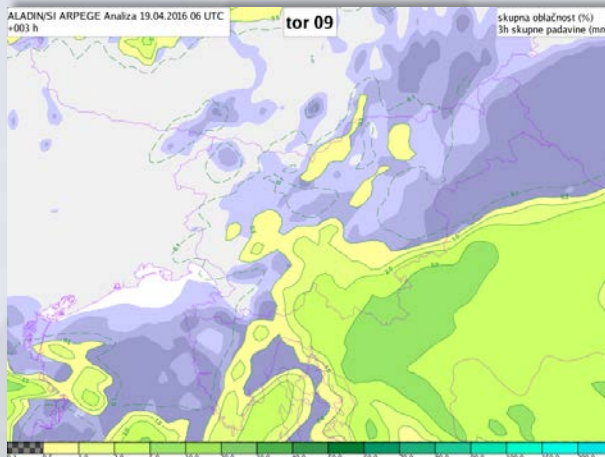
Aladin ECDA (up to +72h) + LAEF Ensemble



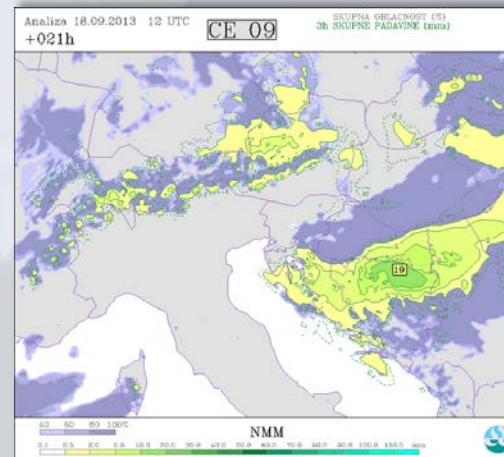
ECMWF (up to +240h)



Aladin AR (up to +72h)



NMM (up to +72h)



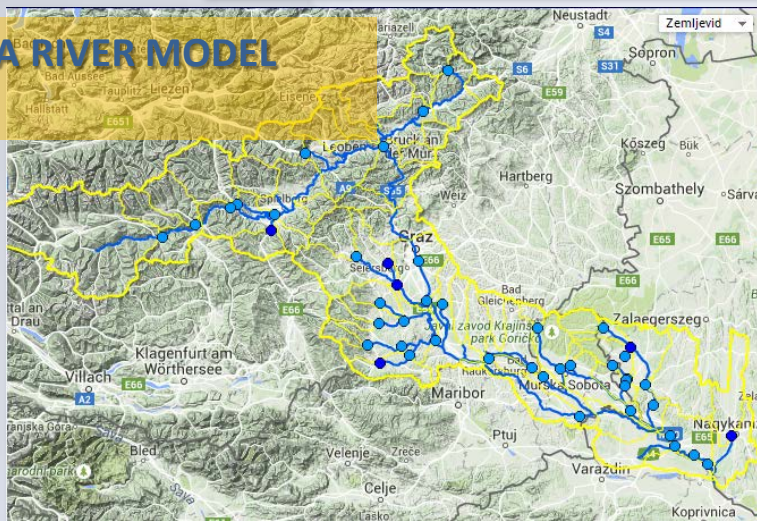
THE HYDROLOGICAL FORECASTING SYSTEM (HFS) OF ARSO



HIDROLOŠKO STANJE IN NAPOVED



MURA RIVER MODEL
2006



SAVA AND SOČA RIVER MODELS
2011



SLOVENIA MODEL
2014

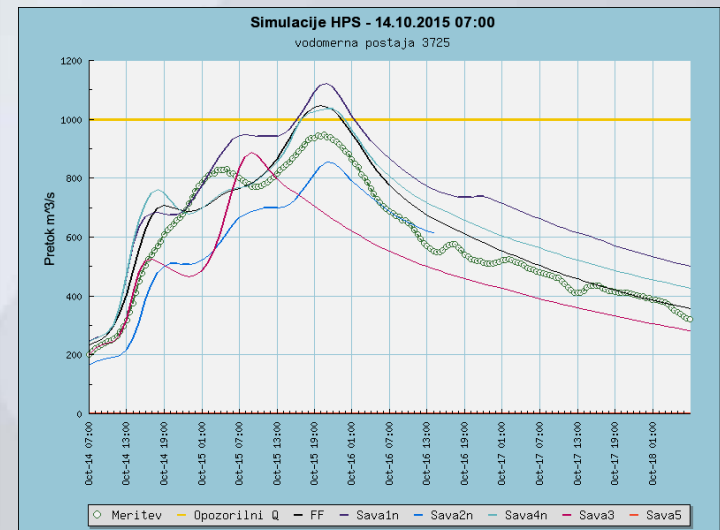
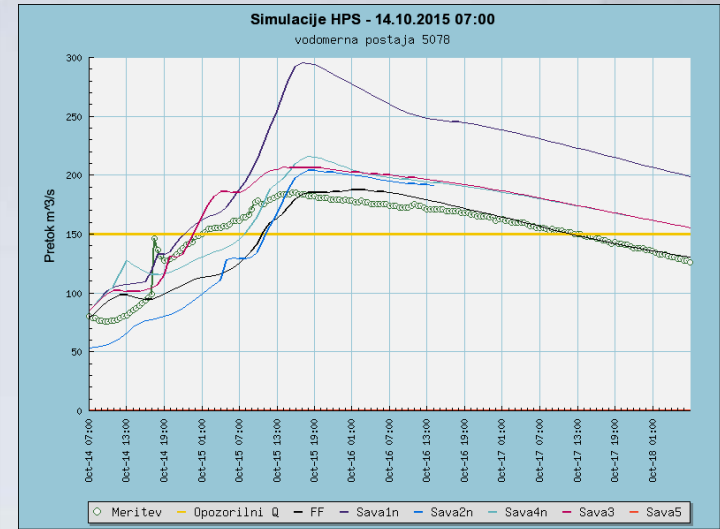
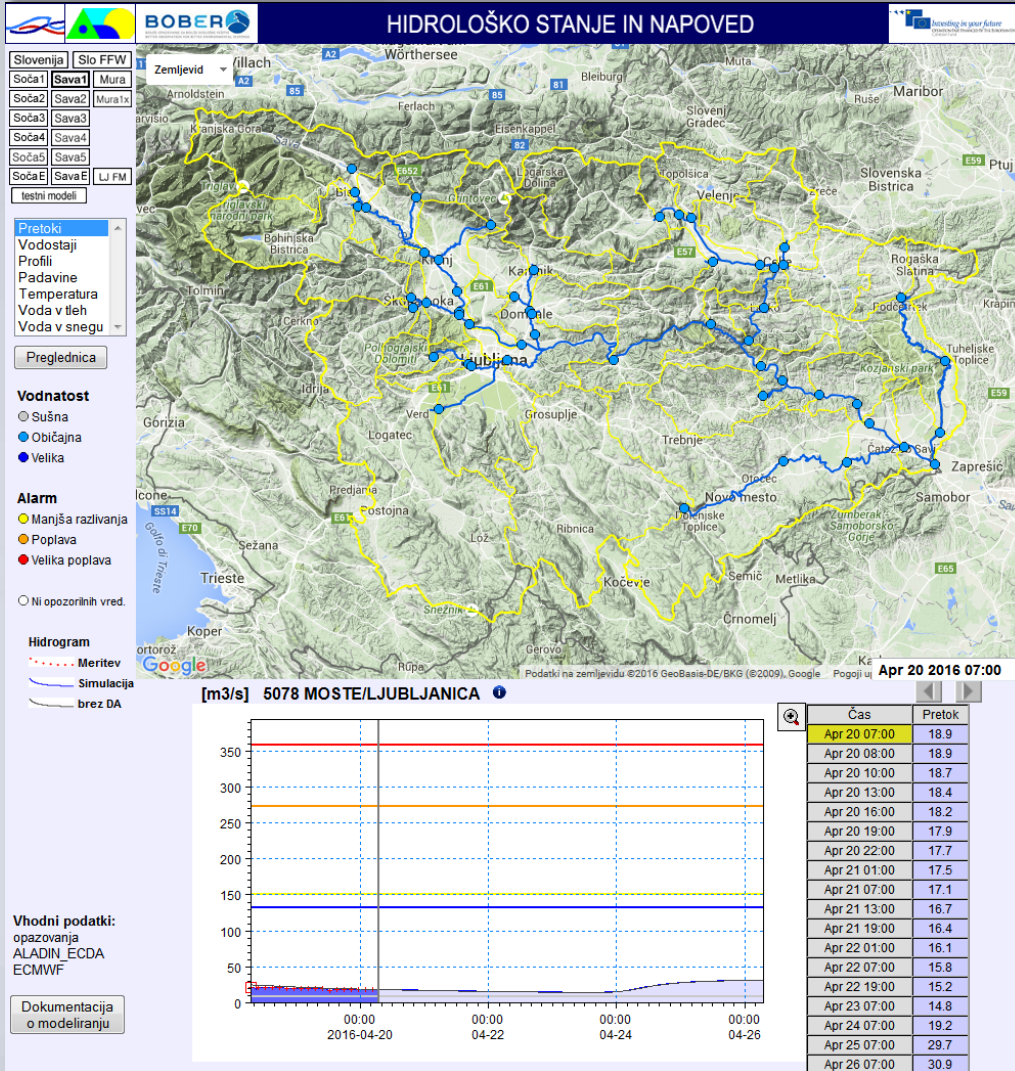


Boundary conditions on the transboundary rivers:

Drava – EFAS forecast

Mura – Mura model forecast

HFS SIMULATION RESULTS

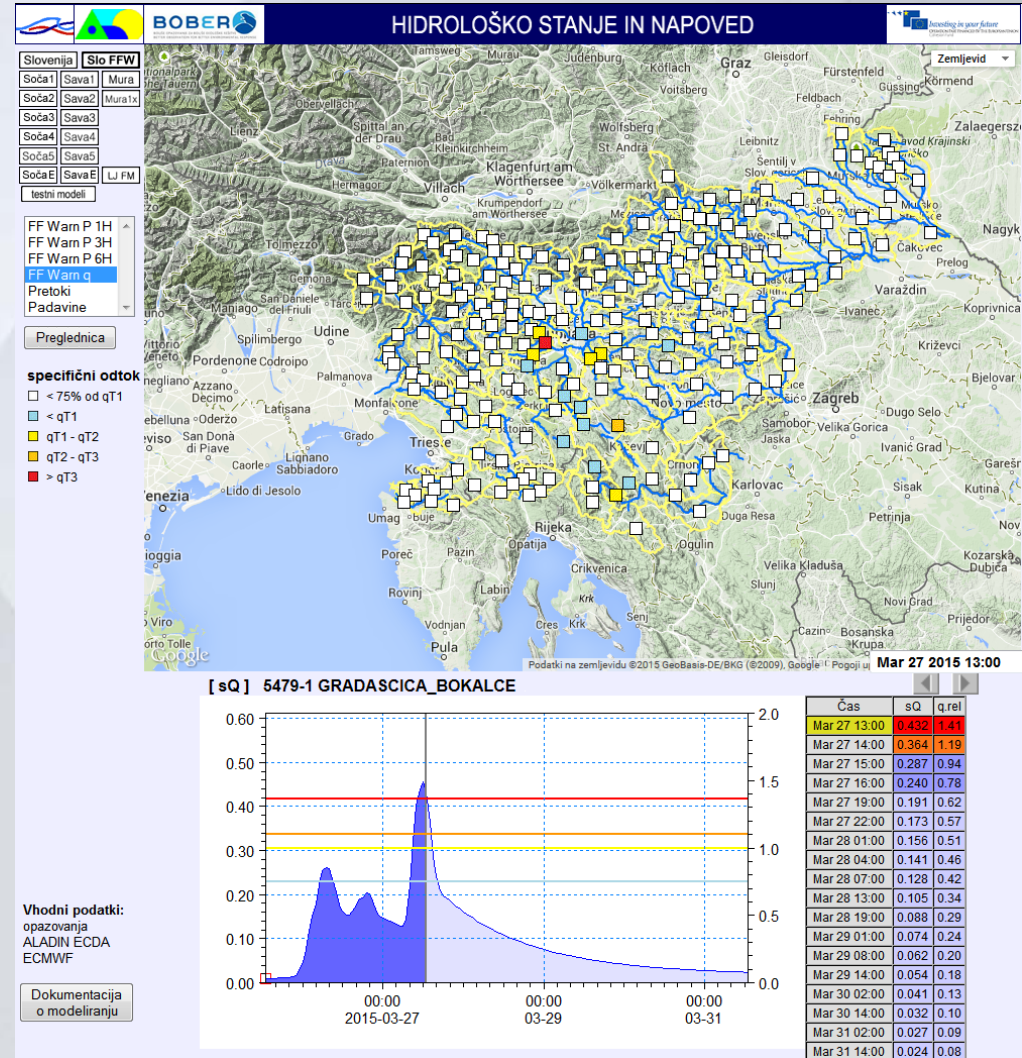


HFS WARNING PRODUCTS

Statistically derived tresholds:

- 1h cummulative rainfall [mm]
- 3h cummulative rainfall [mm]
- 6h cummulative rainfall [mm]

Catchment specific runoff
[m³/s/km²]



WARNINGS, text, graphics, multimedia

REPUBLIKA SLOVENIJA
 MINISTRSTVO ZA OKOLJE IN PROSTOR
 AGENCIJA REPUBLIKE SLOVENIJE ZA OKOLJE

Vojkova 1b, 1000 Ljubljana

T: 01 478 40 00
 F: 01 478 40 52
 E: gp.arso@gov.si
 www.arso.gov.si

FAX Za: **Republiška uprava za zaščito in reševanje, Center za obveščanje RS**
 fax: 471-32-82, 471-32-81

Od: Oddelek za hidrološko prognozo
 tel: +386(0)1 478 41 47
 fax: +386(0)1 478 40 52

Datum: 14. 10. 2015 ob 8:00

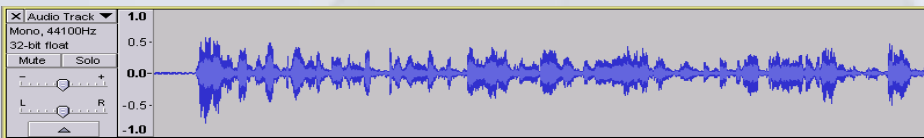
OPOZORILO

Zaradi močnih nalivov bodo danes dopoldne hitreje naraščali hudourniki in reke v Vipavski dolini, na Goriškem, na območju Idrijsko-Cerkljanskega hribovja ter v jugovzhodni Sloveniji. Pri tem lahko pride do razlivanj na izpostavljenih mestih ob vodotokih.

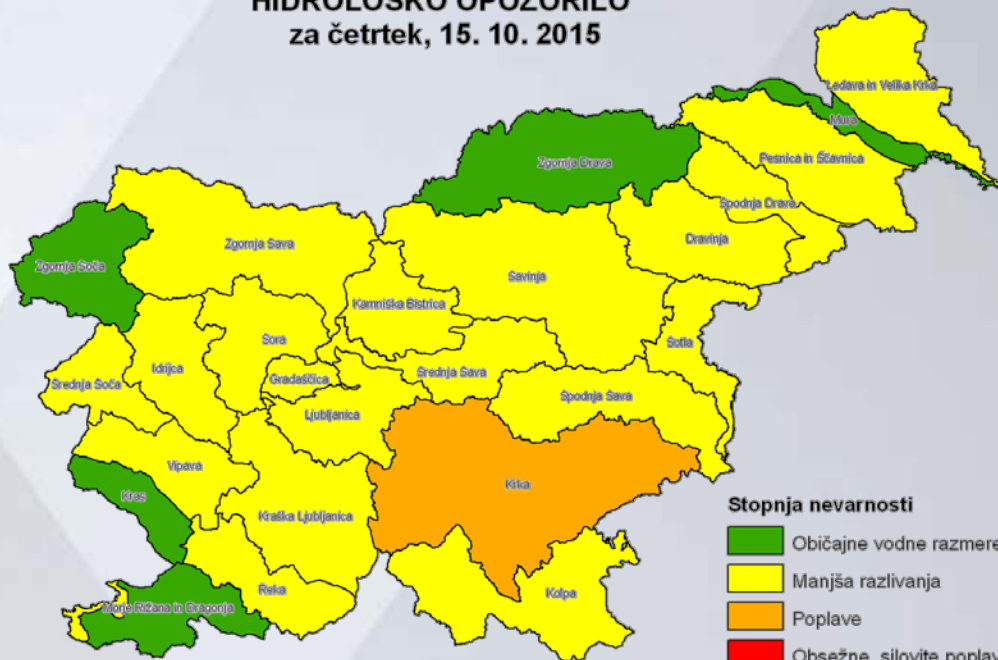
Danes tekom dneva bodo reke po državi močneje naraščale, zvečer in v noči na četrtek lahko pride do razlivanj manjših vodotokov v jugozahodni, osrednji in jugovzhodni Sloveniji. V četrtek bodo reke še naraščale, do razlivanj v nekoliko večjem obsegu lahko pride zlasti na porečju Krke.

Danes dopoldne, med 9. in 12. uro, bo gladina morja ob slovenski obali zaradi visokega plimovanja in južnega vetra povišana. Ob tem lahko morje poplavi nižje predele obale.

Lep pozdrav,
 Hidrološka prognoza



HIDROLOŠKO OPOZORILO za četrtek, 15. 10. 2015



Stopnja nevarnosti

- Običajne vodne razmere
- Manjša razlivanja
- Poplave
- Obsežne, silovite poplave

Urad za hidrologijo in stanje okolja
 Sektor za analize in prognoze površinskih voda
 Oddelek za hidrološke prognoze

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Izdano: 14. 10. 2015 ob 8:00

year	2010	2011	2012	2013	2014	2015	2016
issued warnings	114	32	125	118	234	74	43

WARNING, DATA AND FORECAST DISSEMINATION

Authorities:

Ministry of Defence,
Administration for Civil Protection and Disaster Relief

Media and general public:

Radio and TV stations, teletext, newspapers

Neighbouring countries (bilateral agreements):

Authorities in Croatia, Italy and Hungary (Austria)

**ARSO website, meteo.si, MeteoAlarm,
ftp, e-mail, fax, telephone communication**

CONCLUSION

Flood forecasting issues in Slovenia:

- flash flood forecasting and warnings
- communicating flood event uncertainty to the end users, media and general public
- general flood and flood warning awareness

SEEFFG system is not in operative practice at ARSO:

- Major issues: catchment delineation and MAP products



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Thank you for your attention!