

Implementation of the nowcasting system in Croatia

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Extreme weather events

- Extreme weather events are happening much more frequently
- Significant consequences for the society and the economy
- Flash floods, heat/cold waves, hurricanes, thunderstorms

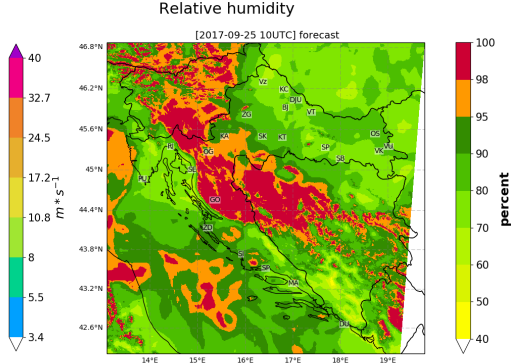
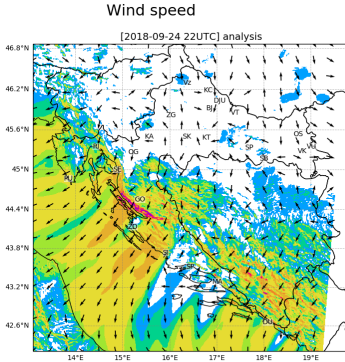


Nowcasting

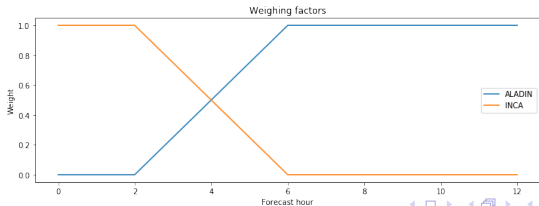
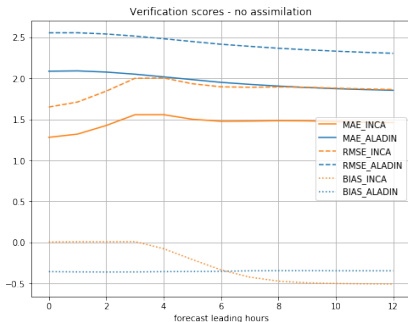
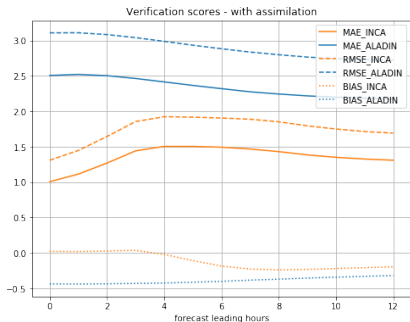
- Forecasting weather conditions with the local detail over a period from present to a few hours ahead
- Includes different extrapolation techniques, statistical techniques, numerical weather prediction models, etc.
- Provides a good analysis of present weather conditions and extrapolates them in time

- Integrated Nowcasting through Comprehensive Analysis
- Analysis and nowcasting system
- Resolution: 1 km horizontally, 200 m vertically
- LAM as first guess
 - COSMO
 - ALADIN
- Merges all available observations
 - Stations
 - Radars
 - Satellite products
- Interpolates prognostic fields over the domain - maps current weather
- Uses an estimate of its speed and direction of movement to forecast the weather a short period ahead - assuming the weather will move without significant changes

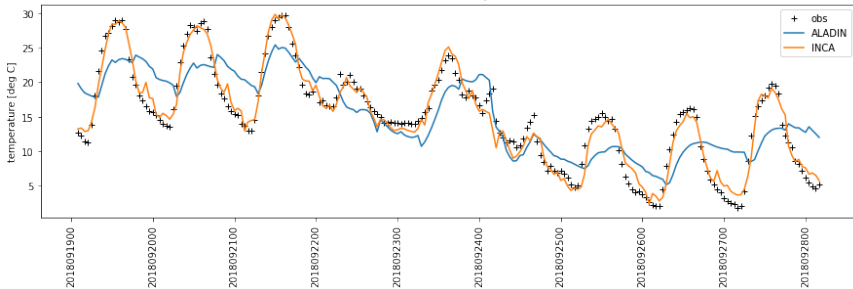
- Forecast: 2m temperature, dew point temperature, wind chill, wind speed, relative humidity, icing potential, freezing level, snowfall line, precipitation, solid precipitation
- Analysis: Trigger temperature, CAPE, CIN, LCL, LFC, LI, SI



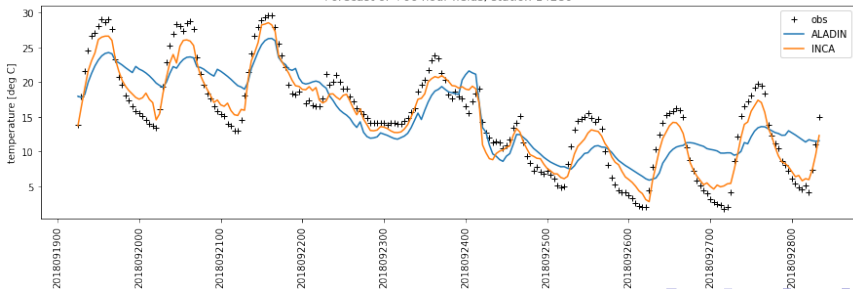
- Problem with complex orography representation - Opatija, Višnjan, Malinska, Rab, Senj, TS-Obrovac, Šibenik, Dubrovnik, Prevlaka



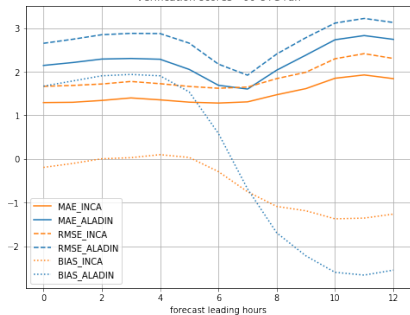
Forecast of +02 hour fields, station 14280



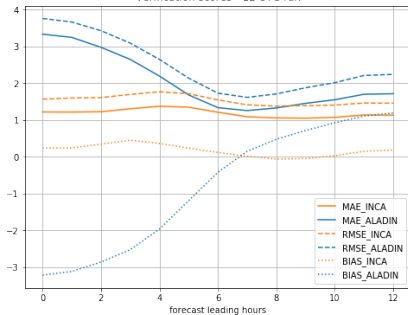
Forecast of +06 hour fields, station 14280



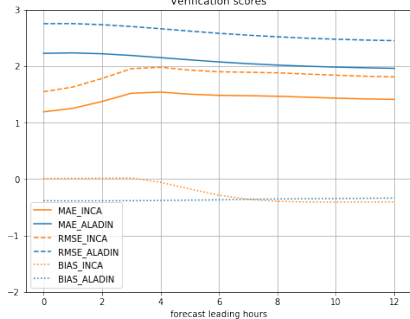
Verification scores - 00 UTC run



Verification scores - 12 UTC run

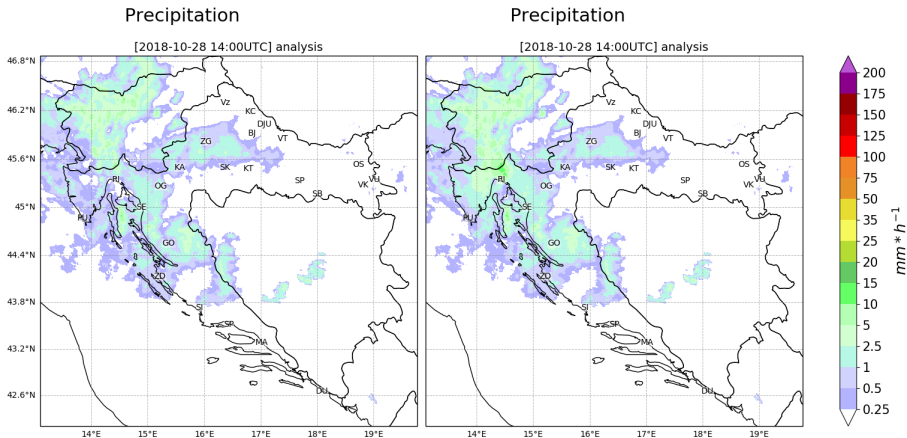


Verification scores



INCA precipitation module

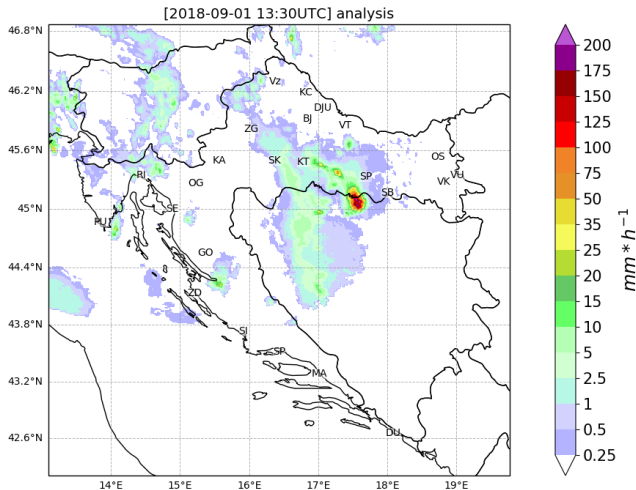
- OPERA (Operational Programme for the Exchange of Weather Radar Information) instantaneous surface rain rate radar composites [mm/h]



INCA precipitation module

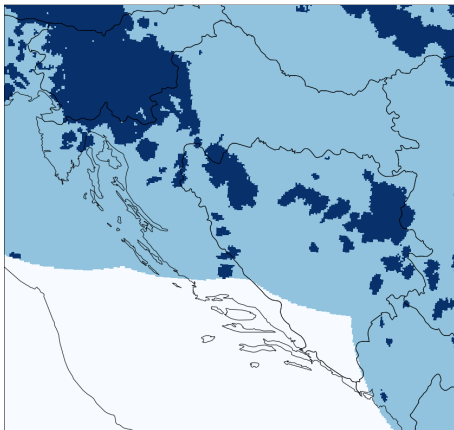
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Precipitation



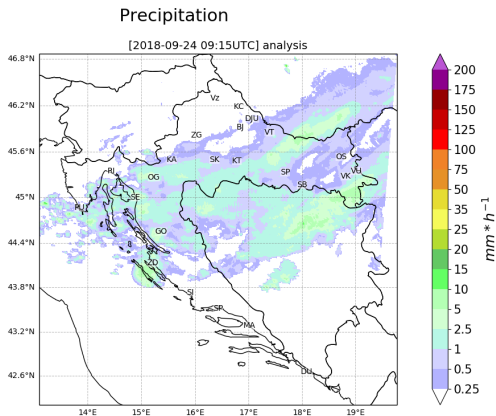
INCA precipitation module

- OPERA radar and automatic station precipitation measurements coverage



INCA precipitation module

- OPERA radar composites precipitation amounts in coastal area - large difference when compared with station measurements



Conclusions

- Comparison showed overall improvement over ALADIN during first six hours of INCA run initiation
- Two significant ALADIN forecast runs (00 and 12 UTC) were also isolated and compared to the INCA forecast fields. It was shown that ALADINs cold temperature bias during the day and warm temperature bias during the night were significantly corrected by the INCA nowcasting system
- Lack of radar measurements along the Adriatic coast proves to be a problem for precipitation fields
- INCA precipitation module efficiency is limited to continental part of Croatia, but first results look promising