Regional Cooperation for
Limited Area Modeling in Central Europe

LACE
nwp central europe

ALARO experiences in Croatia

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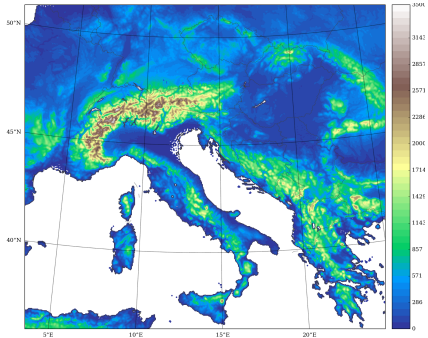
ZAMG DHMZ Czech Hydrometeorological Institute OMSZ IMGW METEO ROMANIA SHMU ARSO METEO Slovenia

Outline

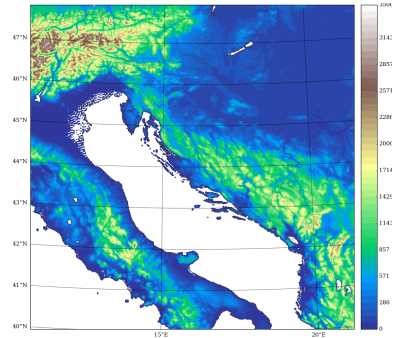
- Overview of operational configurations
- Validation of CY43 based e-suite and its tuning
- Case studies
  - Summer heat wave
  - Convection
  - Freezing rain
- Future plans

Current operational configurations



ALADIN-HR4

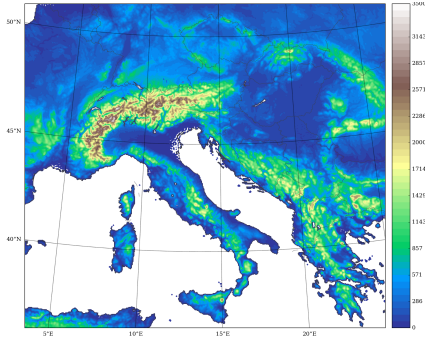
Δx=4 km; 480x432x73 GPs; CY38T1; hyd. dyn.; Δt=180 s; ALARO-0 phys.; CANARI+3DVar (3h-cycle); 72h fcst.; LBCs: IFS-1h (lagged mode); 4 runs per day



ALADIN-HRDA

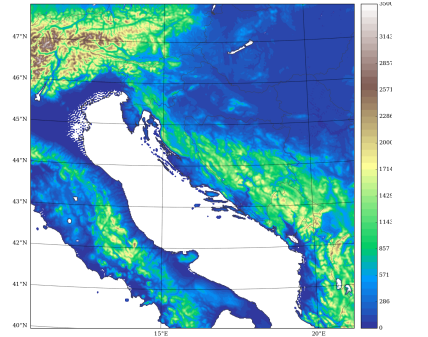
Δx=2km; 450x450x32 GPs; CY29T2; hyd. dyn.; dyn. adapt. mode; Δt=60 s; 72h fcst.; ICs/LBCs: ALADIN-HR4; 4 runs per day

Future operational configurations (15.9.2022.-)



ALADIN-HR4

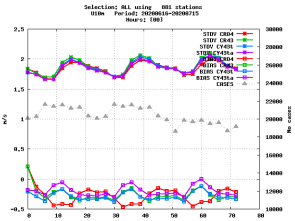
Δx=4 km; 480x432x73 GPs; CY43T2; hyd. dyn.; Δt=150 s; ALARO-1 phys.; CANARI+3DVar (3h-cycle, ENS B-matrix); 72h fcst.; LBCs: IFS-3h (lagged mode), 4 runs per day

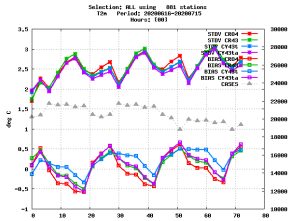


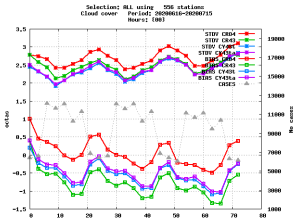
ALADIN-HR2

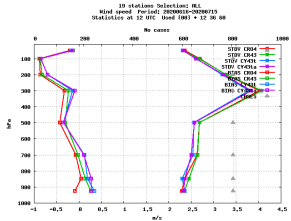
Δx=2km; 450x450x87 GPs; CY43T2; non-hyd. dyn.; with DFI; Δt=60 s; ALARO-1 phys.; 72h fcst.; ICs: ALADIN-HR4; LBCs: IFS 1-h (lagged mode); 4 runs per day

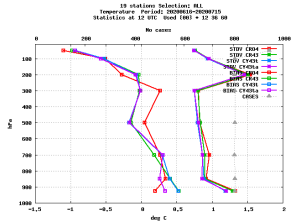
Validation of CY43 based e-suite and its tuning









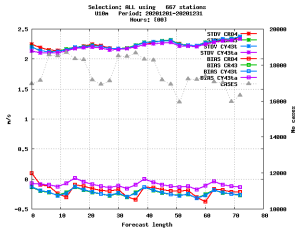


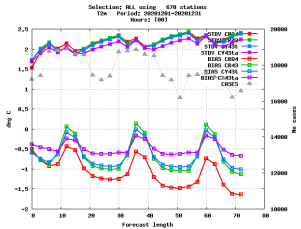
Tuning:

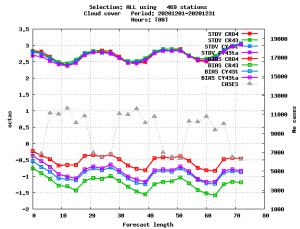
RMULACVG↓, QSSC↑, WCRIN↑

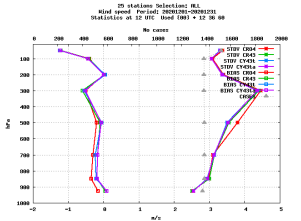
RCTVEG(3,4)↓, ACLS_HS↑

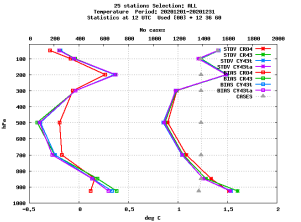
Validation of CY43 based e-suite and its tuning











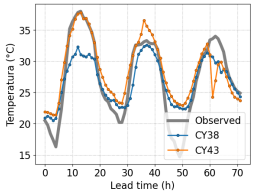
Tuning:

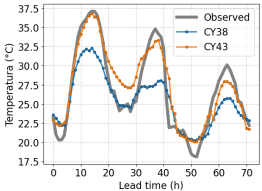
RMULACVG↓, QSSC↑, WCRIN↑

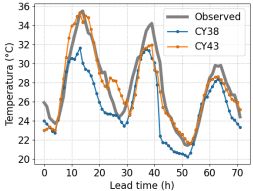
RCTVEG(3,4)↓, ACLS_HS↑

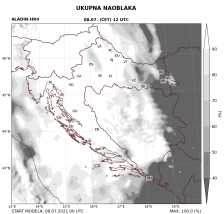
SHW case 1 (8.7.2021.) - CE and NO Croatia

- CY38 config. failed to predict the peak of the SHW event (cloudiness related problem)

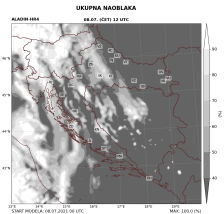




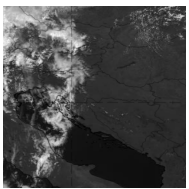




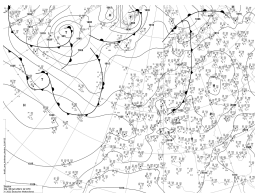
CY38



CY43

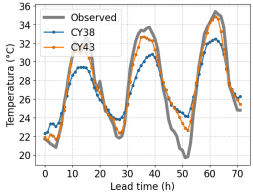


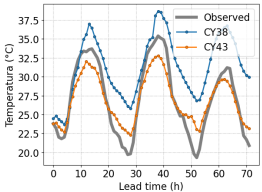
satellite data

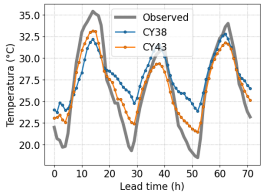


SHW case 2 (26-28.7.2021.) - CE and NO Croatia

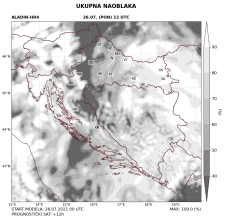
- CY38 config. fails to predict the peak of the SHW event (inconsistency from day to day)



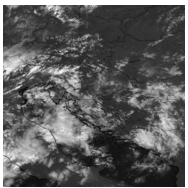




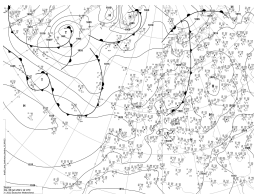
CY38



CY43

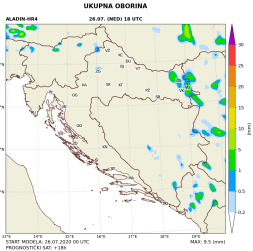


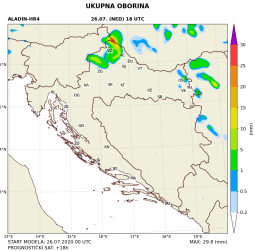
satellite data

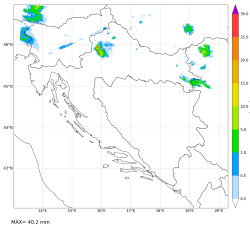


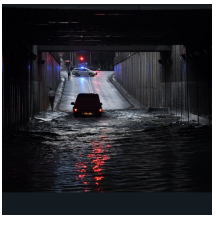
Convection case 1 (26.7.2020.) - Zagreb

- 2 days after the record beating event which was misplaced in time (both by CY38 and CY43)
- nicely captured by the CY43 based e-suite)



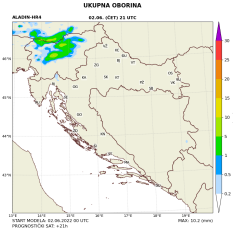


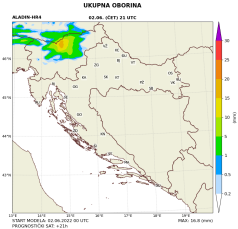


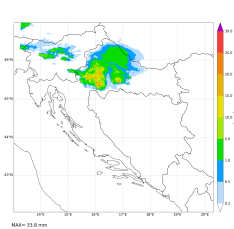


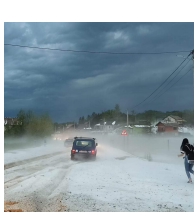
CY38 CY43 radar data

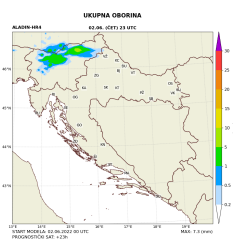
Convection case 2 (2.6.2022.) - Northern Croatia

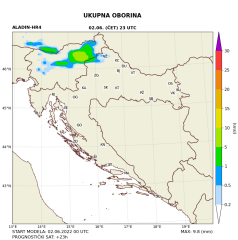


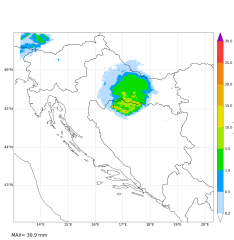


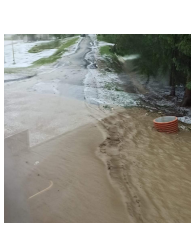








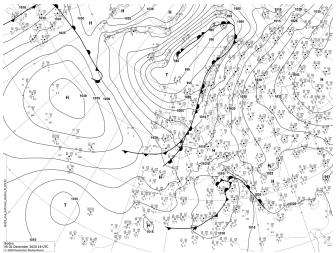




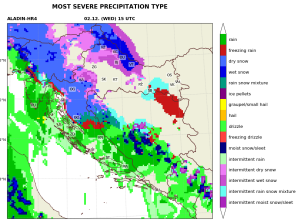
CY38 CY43 radar data

Freezing rain case (2-3.12.2020.)

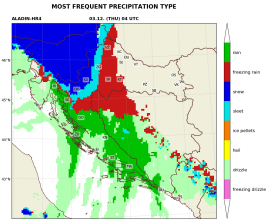
- CY43T2-based ALADIN-HR4 e-suite, with prec. type module, was released on 1st of December 2020 (several cases during that winter)
- The precipitation type output is adapted to be comparable with IFS



Genoa low moving towards SE



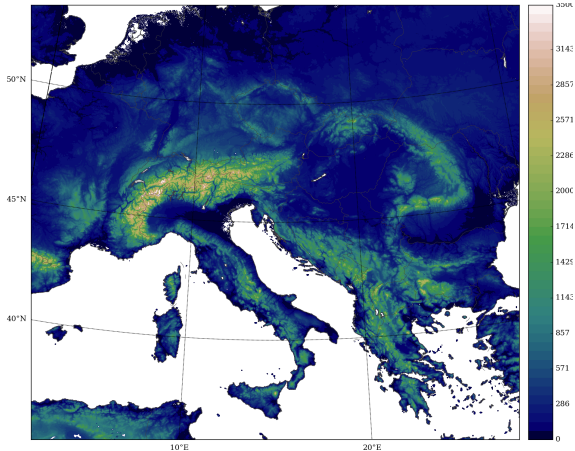
localized event near SB



adapt. for comparab. with IFS

Plans for future

- Single operational configuration at Δx=1.8 km; 1296x1152x87 GPs; non-hyd. dyn.; Δt=60 s; ALARO-1 phys.; 72h fcst.; LBCs: IFS 1-h (lagged mode); new roughness fields
- ALARO-1 + SURFEX (?)
- Creating a nowcasting system (within DHMZ priorities) - in very preliminary phase



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LACE
nwp central europe

Thank you for your attention!

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