*Regional Cooperation for*
*Limited Area Modeling in Central Europe*

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# Data assimilation activities at CHMI

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# Progress summary since last DAWD

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- **Fraction Skill Score tool comparing model to radar rainfall estimates + rain gauges over the Czech Republic**
- **High resolution atmospheric motion vectors were studied to validate the upgrade of NWC SAF - Alena's talk**
- **Radar data assimilation - sensitivity test of reflectivity inversion to RH on number of profiles, size of the are were we search for the profiles and to sharpness of weight for the profiles - Suzana's talk**
- **New HPC - NEC Aurora is operational**

# Operational Setup at CHMI

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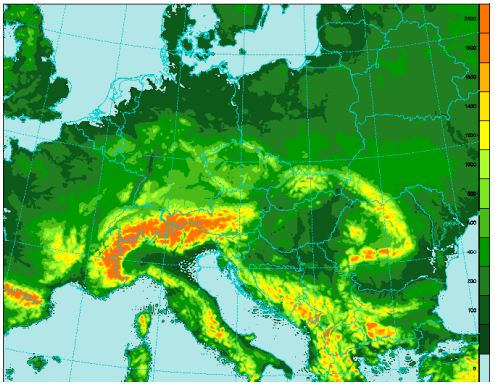


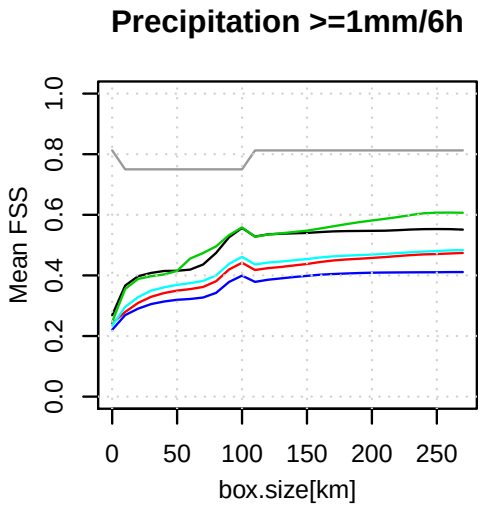
- **ALARO NH-v1B cy43t2ag:**
  - domain: △x 2.3km, 1069x853GP, time step 90s
  - 87 vertical levels, mean orography
  - 3h space consistency coupling ARPEGE synchronous
  - forecasts up to +72/+54h at 00, 06, 12 and 18 UTC
  - weak IDFI of short cut-off production analysis
- **Upper air analysis** – BlendVar scheme
  - BlendVar = DF Blending (filter. at trunc. E102x81) followed by 3D-Var
  - 6h assim cycle, no IDFI in the next +6h assim guess
  - REDNMC=0.5, Ensemble Data Assimilation B matrix based on AEARP
  - ±1.5h assim window, VARBC 24h cycling
  - Assimilated observations: SYNOP (Ps), TEMP (t, q, u, v), AMDAR (t, u, v), SEVIRI (channels: 2, 3), Mode-S MRAR CZ / Mode-S EHS from KNMI (t, u, v) HR-AMV, wind profiler (u,v), ASCAT
  - SIGMAO_COEF=.67, SIGMAO_COEF(AMDAR)=2.8, SIGMAO_COEF(RADIANCE)=1.15
- **Surface analysis** – OI based on GTS SYNOP + national SYNOP (T2m, RH2m)
  - REF_A_(H2/T2)=40km

# Fraction skill score

- FSS (Roberts & Lean, 2008) is computed for model rainfall forecast against radar rainfall estimates + rain gauges product (called Merge2) over the Czech Republic
- Program R used,

  - FSS algorithm from verification package optimized

  - Rfa is used to convert ALADIN Lambert projection to utm33.
- FSS for several box sizes and several precipitation thresholds
- The forecast is usefull when its FSS score is larger than FSS uniform
- We count useful forecasts and divide them by total number of forecast (usefull FSS)
- FSS for period is computed either by mean of daily FSS or by usefull FSS



# New HPC

- NEC SX-Aurora Tsubasa
- 48 computing nodes
- Each node: one AMD EPYC (Rome) EPYC 7402 processor (24 cores, 2.8 GHz clock rate and 512 GB RAM) + 8x NEC Aurora Vector Engines (8 cores, 1.6 GHz and 48GB RAM)
- peak performance 940.8 teraflops provided by 384 VEs, 3072 cores

# Future Plans

- **Increase BlendVar cycling frequency from 6h to 3h**
- **Extend use of existing observations:**
  - **radar data**
  - **radiances from polar satellites, eventually GNSS data.**

# End

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**Thank you for your attention !**



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# References

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