



Highlights of the past year

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EWGLAM/SRNWP meeting

Prague, 30/09/2024

Key developments in Harmonie-Arome

- In DA/UO: focus on all-sky radiances, preparations for new satellites, adapting DA algorithms to OOPS framework and overall DA/UO retuning exercise. Coupled data assimilation gaining momentum.
Parallel session on DA
- In forecast model: focus on scale-aware parametrizations, introduction of NRT aerosol from CAMS, and validation of many-layer surface schemes in NWP and climate modes.
Parallel session on physics, surface
- Hectometric scale modelling developments: many efforts in DestinE context, extending to sub-km DA/EPS and modelling over urban areas. *Presentations in Applications session.*
- Refactoring / validating forecast model codes, to enhance interoperability and facilitate use on wide variety of architectures, incl. GPU
- Strong focus on improving (and documenting) meteorological quality assurance: component validation, process-oriented verification, use of observations from DA screening, developing benchmark tests for both NWP and ML models.
4 presentations in Verification session

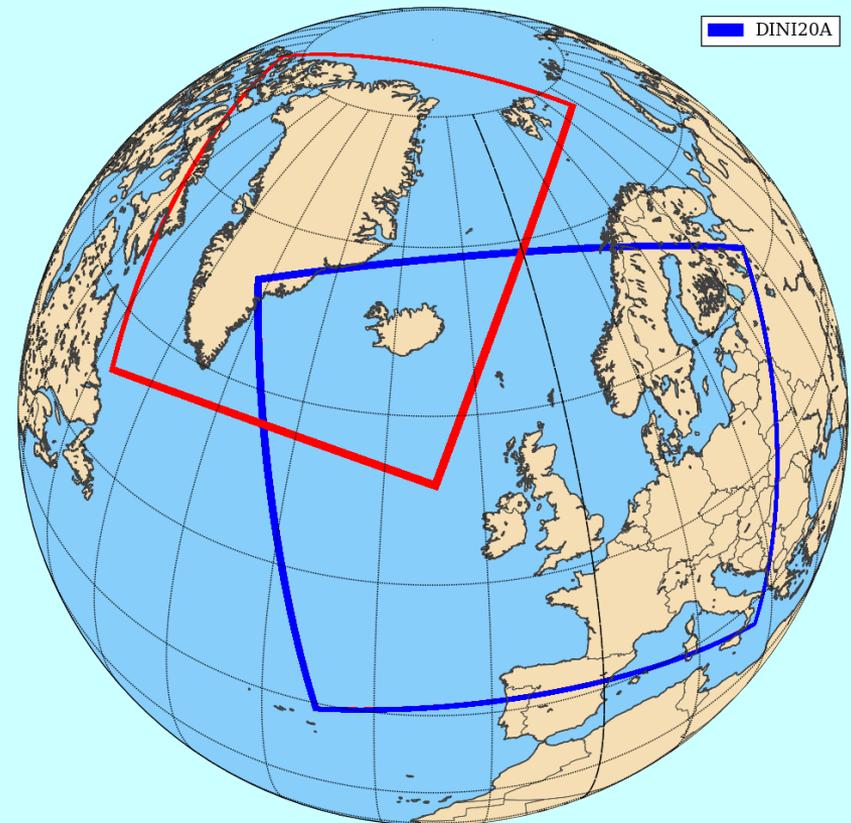
Operational cooperation in United Weather Centers (UWC)

Growing operational cooperation in three operational subgroups within the 11 HIRLAM / United Weather Centers (UWC) NMHS's:

- MetCoOp cooperation extended to six NMHS's (No, Sw, Fi, Es, Lv, Li)
- UWC-West (Dk, Ic, Ir, NI) fully operational since March 19, 2024 (see presentation Sander Tijm)
- AEMET

All three groups basically use the same Harmonie-Arome model (with relatively small deviations) and workflow, provided by HIRLAM.

Striving for growing interaction/alignment between operational subgroups



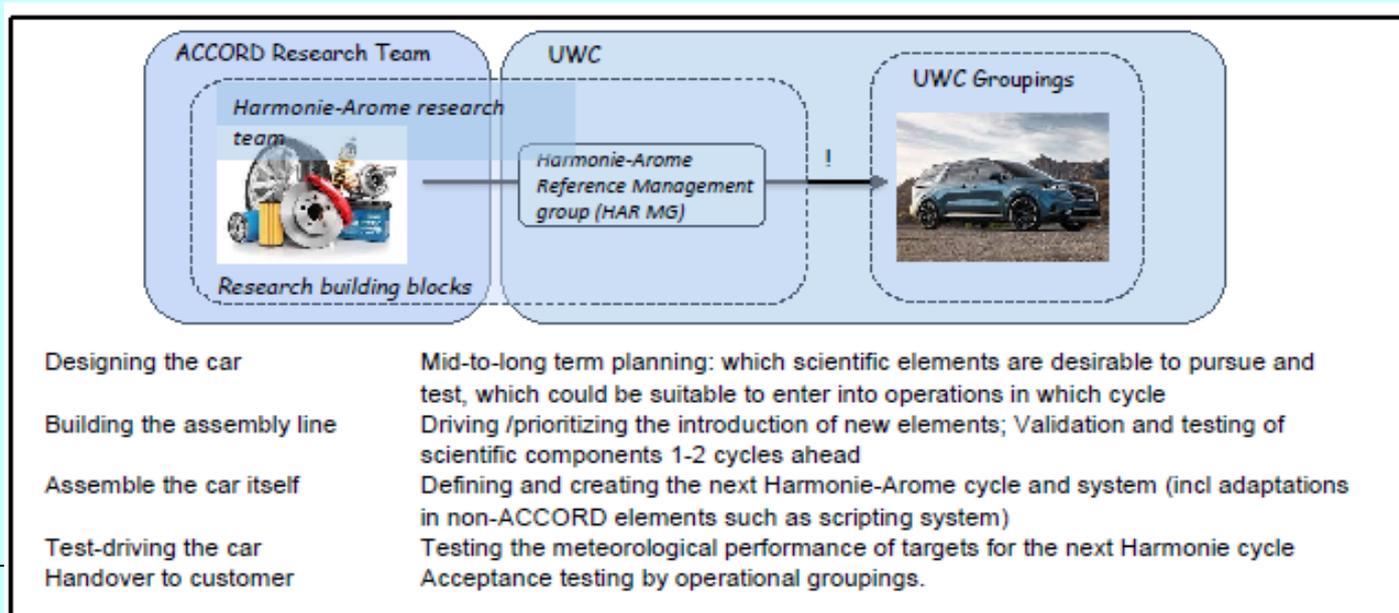
Evolving relations and interfaces between HIRLAM, ACCORD and UWC

Research coordination is gradually being shifted from HIRLAM to ACCORD level

Remaining responsibility of HIRLAM: deliver a Reference model and system configuration which can be used by all members for research and for operations

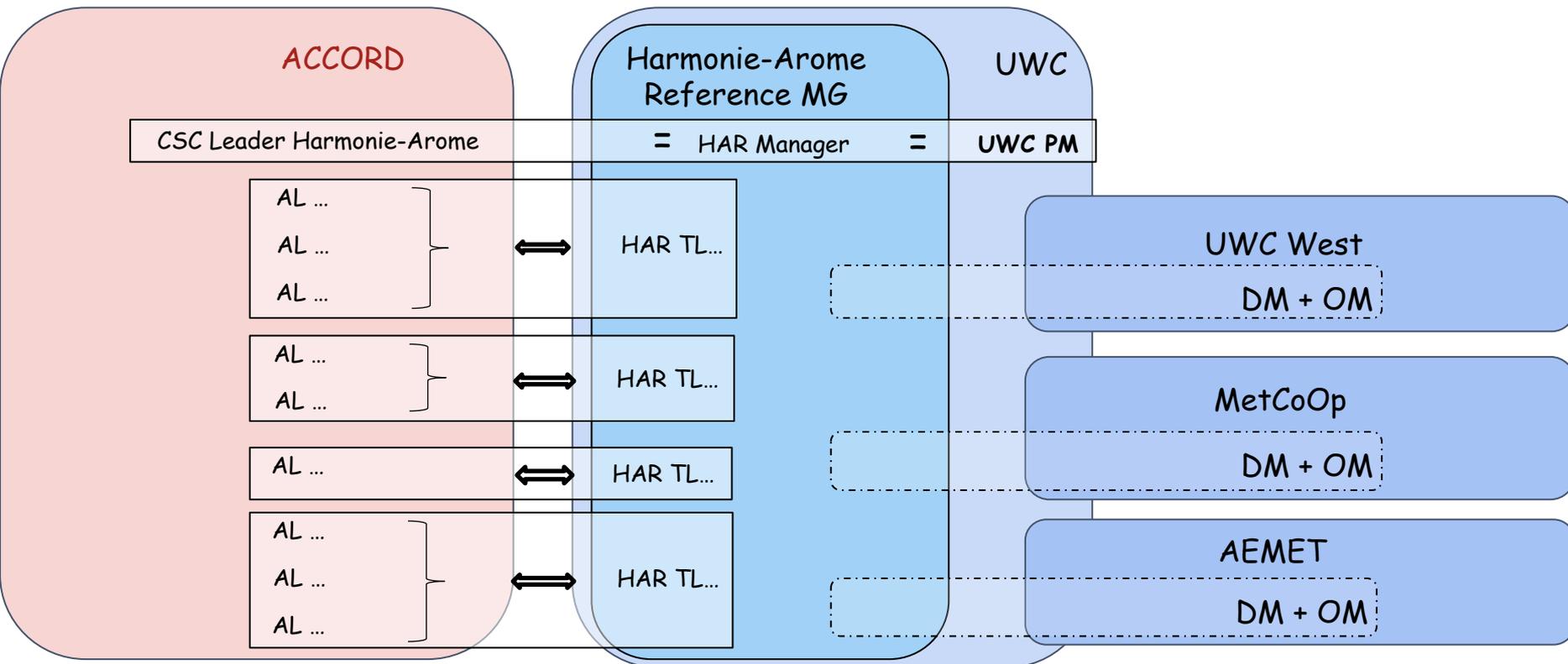
Preparing for new situation in which

- NWP research is (mostly) coordinated at ACCORD level
- Within UWC, a Harmonie-Arome Reference MG coordinates the planning and evolution of the Harmonie-Arome Reference configuration
- the HIRLAM programme will be terminated by end 2025 (at its 40th anniversary)



*DRAFT (work in progress) HAR MG in UWC with Team Leaders (TL)
aligned with (new) ACCORD Area Leaders (AL)*

From 2026



In memoriam Nils Gustafsson



SMHI



Scientific questions to be addressed
at the hecto-metric scales data assimilation Workshop
“Should we assimilate data into hecto-metric scale models and
if so, how should we do this”

- Nonlinearity and non-gaussianity of the error evolution at hecto-metric scales and appropriate data assimilation algorithms
- Machine Learning and Artificial Intelligence
- Computational aspects
- Uncertainty estimates and modeling of these
- Predictability, model spin-up and adjustment processes
- Resolution, domain size, update frequency and length of the assimilation window
- Observability at hectometric scales, observation handling and quality control
- Process-oriented modeling : atmosphere – land surface – ocean interactions and challenges of coupled data assimilation
- Model development (vertical)+opt model
- Quality/success ratio

All Time-scale of developments: up to 5 years?



Rymdstyrelsen
Swedish National Space Agency



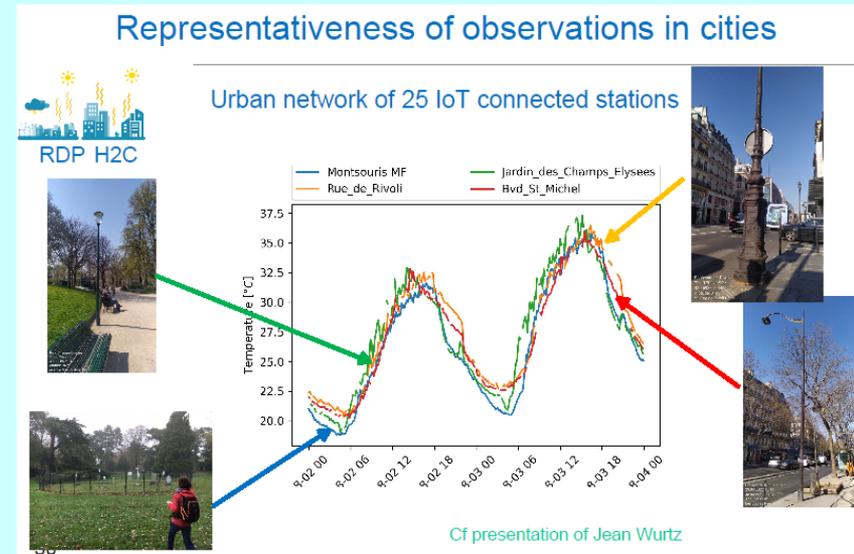
Hectometric modelling efforts are intense... ...but what about observations on hectometric scales???

Our NMS surface observations do NOT capture the **heterogeneity of the surface** which we are trying to model correctly. This is especially true for **urban** areas, which our NMS surface networks do not cover, but which are the places where most people in Europe live...

...There is a growing number of urban networks, and crowd-sourced moving platform observations (*see e.g. presentation Eric Bazile on Paris Olympics RDP*). But are they “good enough” to use in validation or even assimilation? What is their added value, really? And how to use them to best advantage? When NOT to use them?

For discussion:

- (1) should SRNWP push for a European effort on **structural acquisition & exchange of (QC-ed) urban observation data**?
- (2) should we create a focused activity in SRNWP on exchange and cooperation on **assessing such data and how to best use them** (i.e. tackle the challenge of surface inhomogeneity) in our models **over urban areas**?



Thank you for your attention!



Any questions?