HIRLAM Countries

Question 1.

- **IMO** 750 m semi-operational run with 2.5 km Harmonie run for LBC (See ACCORD NL2). They plan to make the 750 m (500?) run operational next year. Expect more use by forecasters and later it could be the main forecast for the first 36 hours on their website.
- **DMI:** has six 750 m operational configurations for coastal Greenland, two regular and 4 on-demand, the latter triggered by predicted storm scale wind by 2.5 km model. Also maintain two real time on-demand sub-km forecast suites, one over Greenland with 750m, another over the Faroe Island with 500m. Maintain a 750m nowcasting suite over Denmark with hourly cycling. Run experimental, on-demand high resolution suites for wind forecast at 500m and 200m for Sealand island.
- ii) For very fine resolution models, the main problem is a lack of high density observation data for verification.
- iii) 750m nowcasting setup will be operationalised after implementation of high density observation data assimilation. For the very high resolution set-up , it will be assessed following evaluation.

- **AEMET:** Testing sub-km resolutions, mainly 500m and < 250m. We feel that the system/configurations are not mature enough for systematic use. We have seen them useful for airport management (wind shear for instance). We have use them also in severe weather events to see if they can add value (diagnosis of extreme weather for instance, spatialization of observation information).
- **Met Éireann:** Planning now for an operational Irish domain at 750m. Issues with boundary effects on small domains; 750m a good compromise and (hopefully) safer in terms of physics. Stability hasn't been a huge problem: Ireland is not very "complex". Tests over Greenland were more demanding. Main challenge is objectively demonstrating a benefit. Applications: improved wind extremes, coastal and storm surge model.
- **Met Norway**: i) Studying the feasibility of employing the sub-km system as an on-demand system for Svalbard. Experimental setup has been used for testing the system, field work planning, aviation forecasting and educational purposes at university. ii) Computational cost, shortage of observations for evaluation, degradation of temperature forecasts in some situations compared to lower resolution system iii) On-demand forecasting system

- **KNMI:** Currently preparing (officially starting Jan 2023) a 500m domain for the Netherlands (incl 4DVAR, 200 km^2) and start experimenting with a 150 m domain for the most urbanised part of The Netherlands. (i / iii) Applications now and in future: urban heat and wind gusts, and hopefully represent physical processes better (convective precipitation, fog). (ii) problems encountering: grey zone of shallow convection and turbulence, boundary spin-up, thinning observations.

Question 2.

- **DMI:** Needs to be development on high density observation data assimilation to increase usability of sub-km models. For on-demand models, initialisation with AROME2AROME nesting needs to be enhanced to extend usability of the high resolution products. Verification methodology need improvement. EPS configuration needed to get full potential of the high resolution modelling.
- **AEMET:** Whole model needs to be revised. The system issues related to a significant increase of the resources complicates its use. I think small domains limit a lot the results.
- **Met Norway:** More work is needed throughout the whole production chain, on evaluation of sub-km systems (verification), high-resolution physiography data, physical parameterisations, initialization/data assimilation, computational aspects, contact with users.
- **KNMI:** Observations for verification and DA methods. Physics/physiography needs effort, but are not the biggest bottleneck.