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On-demand sub-km Harmonie model for storm forecast in Greenland

Xiaohua Yang
Danish Meteorological Institute, Copenhagen, Denmark (xiaohua@dmi.dk)

Coastal Greenland regions suffers frequent winter storms, featuring strong local variability associated with a steepand complex orography. Operational experiences and numerical experiments reveal that high resolution meso-scale model at sub-km grid resolution may be necessary in order to satisfactorily resolve the highly heterogeneous flow situation charactering Greenland storms. On the other hand, running a computationally intensive sub-km meso-scale NWP model for an extensive domain such as Greenland is a formidable task. At Danish Meteorological Institute, efforts have been devoted to find an operationally feasible and affordable setup to improve storm forecast. We propose a setup involving several sub-km domain configurations with Harmonie-Arome forecast system along some of the populated Greenland areas. These sub-km models cover relatively small geographic area and are of a grid resolution ranging from 500 to 1000 m, and nested from the operational 2.5 km Harmonie-Arome forecast suite. While some are run regularly, others are only activated during storm episodes. So far pre-operational experiences with such small domain, sub-km "Harmonie-lite" setup looks rather promising for operational use.