



## **RAS-NAAD: 40-year high resolution North Atlantic atmospheric hindcast for multipurpose applications**

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The results of Regional Climate Models (RCM) are critically important for the analysis of mechanisms steering different mesoscale processes such as frontal structures, spiral-type circulations, internal cyclone structure, including conveyor belts, atmospheric rivers, mesocyclones and others. Near the surface, such products provide valuable information on extreme characteristics of winds, surface fluxes and precipitation. The RAS-NAAD (Russian Academy of Sciences North Atlantic Atmospheric Downscaling) provides 40-year 3D hindcast of the North Atlantic (10N-80N) atmosphere at 14 km spatial resolution with 51 levels in vertical (starting from around 10-12m above the ocean's surface up to 50 hPa) performed with a regional setting of WRF-ARW 3.8.1 model for the period 1979 – 2018. The WRF-ARW non-hydrostatic model was forced at lateral boundaries by ERA-Interim reanalysis and spectral nudging applied to wavelengths of >1100 km for pressure, velocities and temperatures above the planetary boundary layer, keeping the solution prognostic for the alpha to gamma mesoscales.

Here we demonstrate a RAS-NAAD extensive validations with observational datasets and the advantage of using this regional hindcast for a variety of applications, such as the use of the product for forcing high-resolution ocean and wind wave models, analysis of cyclone activity and precipitation, atmospheric transports and atmospheric rivers, analysis of mesocyclones activity (for polar lows) and mesoscale climatology in the region.

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