Advancing regional Environmental Prediction over Northwest Europe and tropical domains

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Increasing the complexity of both weather and climate forecasting modelling systems allows better prediction skills in coastal areas, where equilibrium assumptions between Earth system components break down. It also allows better consistence between earth system components and multi-hazard forecasting. We present recent advances in the regional coupled environmental prediction system through the release of the Regional Coupled Suite – UKC4 configuration. Besides upgrades to all model components, it includes a new Regional Atmosphere and Land configuration (RAL3.3), an online diagnostic of rivers, an option for higher frequency coupling, additional coupling to a biogeochemistry model, the possibility of running near-real time ensemble forecasts and to run climate hindcasts. Upgrades to the system over the UK enable beneficial increase in shortwave radiation reaching the ocean in summer months and a beneficial reduction in wind speed, which is slightly further reduced with wave coupling. RCS-UKC4 has good skills in terms of ensemble wave forecasts during extratropical storms compared to the current operational ensemble. Coupling impacts the ensemble spread in near-surface temperature, generally reducing it, except near the coast and during marine heatwaves where the spread is inflated. In the tropics, we present initial results with the first 10-year climate runs over the maritime continent.