

ECMWF progress in tropical cyclone forecasts

Fernando Prates

fernando.prates@ecmwf.int

European Centre for Medium-Range Weather Forecasts

In 2016, ECMWF has successfully implemented in operations two model upgrades (cycles 41r2 and 43r1) including a major horizontal resolution change (March 2016) in the High Resolution (HRES) model from T_L1279 (18 km) to T_{CO}1279 (9km) and in the Ensemble model (ENS) from T_L639 (32 km) to T_{CO}639 (18 km). The increase of the model resolution has improved the structural representation of tropical cyclones (TC) and led to an improvement of the intensity of those systems in the ENS. The latest model upgrade implemented in operations in November 2016, also include a significant number of scientific contributions, among them the increase of the resolution in the dynamical ocean model for the ENS from 1 degree and 42 layers to 0.25 degrees and 75 layers. Each model upgrade requires extensive testing from all contributions before the hand-over to Forecast Department. The forecasts from the new model upgrade are thoroughly verified against analysis and observations before the implementation in operations. Only in recent years has this been extended to TC forecast performance using roughly one year of forecast runs. Statistical results of TC forecast performance of the current operational cycle is presented. Also, a couple of cases are shown in which inconsistencies detected in the analyses of TCs were investigated. Those cases are caused by a poorly handling of dropsondes released near the core of TCs in the assimilation or in the presence of a background error which exhibit multi-modality structures near TCs. Experiments were carried out to fix these issues and results are encouraging for the selected cases but more extensive testing is required before operational implementation planned for the first half of 2017. Another important research topic, at the Centre, is the work accomplished so far towards a fully coupled HRES for future implementation in operations. Preliminary results of this work is presented. Finally an overview of the available products for tropical TCs forecast is given, emphasising the extended range forecast using a past case.