2019 NWP activities at IPMA

Summary
During 2018 a few changes occurred on the local operational NWP systems (see Section 2): the scripting system has been re-written under open-source (ECMWF) and will enter into operations on a new front-end machine in April. After these changes, the AROME model will be integrated up to 48 hours at 06 and 18UTC (as it is already done at 00,12UTC) and the ALADIN model will be discontinued. Last September, the hourly high-resolution (2.5km) Interpolation (OI) analysis of screen-level parameters - CANARI (Taillefer, 2002) - having as background a short-term forecast from AROME-P2, initialized by a surface Data Assimilation (DA) cycle (Girard and Bazile, 2000), has entered into operations. The new analysis product will replace the older lower-resolution (9km) CANARI which was used in the past.

The Portuguese NWP system version
(The Portuguese SKNWP system is based on a set of SMS/XGdp scripts submitted from a front-end cluster to an HPC IBM platform (see Table). ALADIN-Portugal runs over a domain which covers the Portuguese mainland and the adjacent Atlantic Ocean, including the Portuguese islands, at 9km of resolution and will soon be discontinued. The integration of the AROME forecasting model is done for three domains: Portuguese mainland (PT2), Madeira (MAD) and Azores (AZO) Archipelagos. The latest version of ODIAM_H5 radar data, pre-processed; ODYSSEY (exclusive) filter pre-processed. With this work it was possible to understand the operation of the system and to propose improvements. The new analysis product will replace the old lower-resolution (9km) CANARI which was using

Regional Cooperation
(IPMA has been cooperating with AEMET; BUF GTS SYNOP data is shared on a hourly basis with WMO BUF format and assimilated both at IPMA and AEMET.)

Data Assimilation activities

Radar Data Assimilation
The two actual OPERA data flows, BALTRAD and ODYSSEY (see panel on the left), have been tackled. The Portuguese OPERA Data Information Model data under HDF5 format (ODIM, HS) was examined and validated under BATOR (CY43T2), after being format-homogenized with the RC-LACE Homogenization Of OPERA Files (HOFDF) tool (see panel on the right). The panels here below show the same data - 0.01 elevation angle of Lisbon’s radar reflectivity observation at 12UTC of 29 May 2018 - after different quality control filters have been applied (from left to right): raw data, IPMA pre-processed; BALTRAD pre-processed; ODYSSEY (exclusive) filter pre-processed. With this work it was possible to understand that there is still work to be done to assure that regionally homogenized high quality ODIAM_HS radar data can be used in DA.

Framework of AROME

SAPP
Preliminary evaluation:
Ø VM is easy to install.
Ø Quite stable.
ø Suitable to handle conventional observations used in HARMONIE and provided by GTS, (format adaptations)
Ø Most of the work at IPMA was (and will be) on the processing of new data streams, at IPMA these data streams were never tested.

Tested Configuration at IBM—P8
Optimization of scatterometer winds DA

ASCAT Data Assimilation
More info: E. CALVO, “AEMET NWP activities” poster

ASCAT DA ⇔ reduced (ø4) bias and stdev against HSCAT and OSCAT observations. Latest experiments show impact up to fc=0.09

To Do: (1) investigate best observation sampling: Tests on Supercell

Thinning procedure & observation error. (2) Accounting for ASCAT footprint size in first-guess departure [Mate, Mile, Mt No]. (3) Focus on 4D-Var to overcome time mismatch. (4) Assess the impact of gain on coverage: Use of HY-2B OSCAT-2/3 and CFSOAT too

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The Instituto Português do Mar e da Atmosfera (IPMA) is the Portuguese national ocean and meteorological service. It is located in Lisbon, Portugal, and its mission is to promote and improve the understanding of the oceanic and atmospheric processes, to provide reliable and timely information on the Portuguese continental shelf, as well as on the Indian Ocean and the North Atlantic, and to support sustainable marine and coastal activities (www.ipma.pt).