SPECIAL PROJECT PROGRESS REPORT

Reporting year 2020

Project Title: HARMONIE-AROME improved data assimilations of scatterometer winds

Computer Project Account: spptmont

Principal Investigator(s): Isabel Monteiro

Affiliation: IPMA

Name of ECMWF scientist(s) collaborating to the project (if applicable)

Start date of the project: 01/04/2020

Expected end date: 31/12/2022

Computer resources allocated/used for the current year and the previous one

(if applicable)

Please answer for all project resources

		Previous year		Current year	
		Allocated	Used	Allocated	Used
High Performance Computing Facility	(units)	NA	NA	1 310 000	599 455 (45%)
Data storage capacity	(Gbytes)	NA	NA	96 700	0

Summary of project objectives

HARMONIE-AROME 4D-Var operational feasibility tests are ongoing in different NWP centres anticipating its operational implementation for soon. Our goal is to investigate optimal strategies to use scatterometer winds with a focus on HARMONIE-AROME latest developments in 4D-Var.

Summary of problems encountered

The project only started in April, so far there were no problems encountered……...

Summary of plans for the continuation of the project

This year, experiments will be mainly devoted to tune 4D-Var settings and testing different assimilation strategies for scatterometer winds. Based on these results, the following two years will be dedicated to run long experiments and perform verification.……..……

List of publications/reports from the project with complete references

No publications yet.……

Summary of results

1) **Implementation of HARMONIE-AROME for the study domain-and reference experiment**
   We have implemented the technical settings for HARMONIE-AROME cy43 for the Iberian Peninsula (Fig. 1):
   - 3D-Var data assimilation system with 3-hour cycling and 3h assimilation window centred at analysis time.
   - 2.5 km grid size
   - 65 levels with model top at 10 hPa (~26 km) and the lowest model level around 2m.
   - Lateral boundary conditions are obtained from the global ECMWF HRES forecasts.

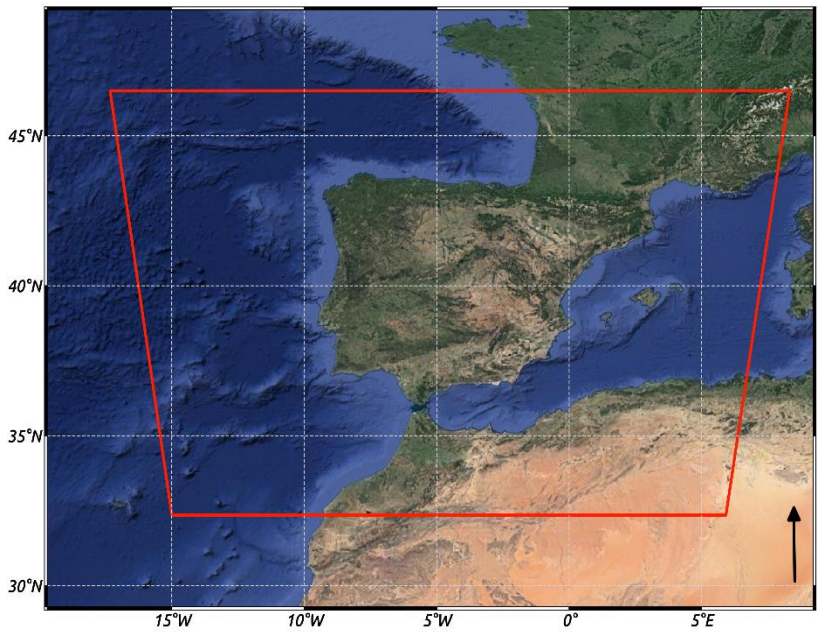

Figure 1 - HARMONIE-AROME mesoscale model domain centred at 40 degrees latitude and -4.5 degrees longitude. Composed of 648x800 grid points with a grid size of 2.5 km, covering a 1620kmx2000km area.

This configuration will be used in this study to perform the reference or control experiment. The observations used in data assimilation for the control experiment will be

conventional (from MARS archive) and scatterometer winds observations (from OSISAF/KNMI archive). Conventional observations include surface pressure from SYNOP ground stations over land and sea (from ships) and buoys, wind observations from buoys, radiosonde and AMDAR and temperature observations from radiosondes and AMDAR and wind observations. Scatterometer winds used in the control experiment are obtained from the 3 ASCATs (ASCAT-A, ASCAT-B and ASCAT-C).

2) Choice of the 4D-Var setup

In order to define the 4D-Var setup, as a first step, we started to implement and test for the Iberian domain the default settings used in the harmonie_cy43h2.2.

3) Testing of scatterometers

In parallel we also started to perform preliminary tests of the use of scatterometers in our assimilation system. The first tests were done using ASCAT-A, ASCAT-B and ASCAT-C winds.

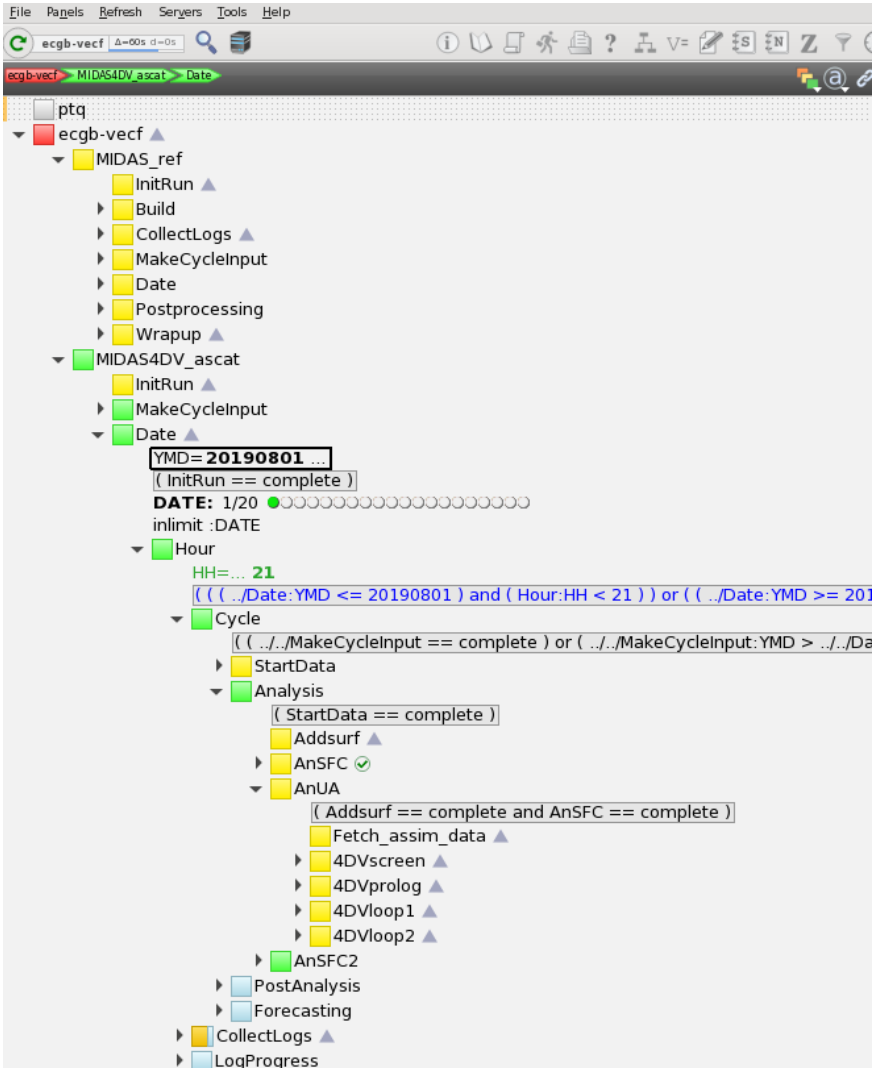

Figure 2 Screenshot from ecflow_ui showing the workflow of the reference experiment and the ASCAT-A/B/C tests