

SPECIAL PROJECT PROGRESS REPORT

All the following mandatory information needs to be provided. The length should *reflect the complexity and duration* of the project.

Reporting year 2020

Project Title: Underestimate of modelled offshore blowing winds

Computer Project Account: SPITWM

Principal Investigator(s): Luciana BERTOTTI

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Name of ECMWF scientist(s) collaborating to the project Jean BIDLOT
Nils WEDI

Start date of the project: 01/01/20

Expected end date: 13/12/22

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)	---	---	600000	0
Data storage capacity	(Gbytes)	---	---	200	0

Summary of project objectives (10 lines max)

To assess the present situation for the possible underestimate of surface wind speed when blowing from land to sea. The plan is to analyse extended data set from different resolutions and sources and to understand the reasons why.

Summary of problems encountered (10 lines max)

The COVID-19 pandemic has of course severely affected our planned activity. There is no possibility of activity at ECMWF, and also in Venice we are confined in our home (office is off-limits for the time being, at least till the end of July). Nevertheless, also on the basis of our activity at ECMWF during our last visit in September-October 2019, some progress has been made.

Summary of plans for the continuation of the project (10 lines max)

This project is at its first year of activity. For the future we are planning to develop our research and interaction with people of the Centre possibly after the end of the pandemic life of COVID-19. Many interactions need to be carried on both with ECMWF and UKMO with which some cooperation has already been established.

List of publications/reports from the project with complete references

Summary of results

If submitted **during the first project year**, please summarise the results achieved during the period from the project start to June of the current year. A few paragraphs might be sufficient. If submitted **during the second project year**, this summary should be more detailed and cover the period from the project start. The length, at most 8 pages, should reflect the complexity of the project. Alternatively, it could be replaced by a short summary plus an existing scientific report on the project attached to this document. If submitted **during the third project year**, please summarise the results achieved during the period from July of the previous year to June of the current year. A few paragraphs might be sufficient.

1- The areas of interest.

Two areas have been selected. The Mediterranean Sea, with a highly varied coastline, displaying all the possible orographic features. The English southern part of the North Sea, facing (East Anglia) a very flat coast, hence suitable to check contrary wise the effect of orography on coastal winds.

2- Data to be analysed.

All the required data have been made available, for ECMWF concerning the operational system data (both high resolution and ensemble) plus ERA-5. Because the study is carried out in cooperation, and the common interest, of UKMO, also their data have been made available as : Global (10 Km. resolution), ENS (20 Km.), Europe (4 Km.), UKV (1.5 Km.). All these data have been retrieved and stored as monthly files in a standard format.

3- First results.

Our first attempt was to plot the ratios model/measured wind speed versus “fetch”, i.e. the sea distance run by wind over the sea after “leaving” land. The reference measured data are scatterometer ones. While confirming the results of Cavaleri and Bertotti (2004), although with a different resolution, it was clear that a different approach and representation was required.

This has been found in the representation of Figure 1. Focused in this case on the Mediterranean Sea and on the 9 Km. short term forecast ECMWF results, we show here the ratio model/scatterometer wind speeds as a function of “fetch”. The blue lines refer to unstable conditions, the red ones to stable ones. The variously dotted-dashed lines (see synopsis) refer to different wind speed ranges, the continuous line to the full range of wind speeds.

It is clear that there is a substantial under-estimate by the ECMWF model, the more so when in unstable conditions.

We are presently in the process of summarizing all these results and preparing a paper framing completely the situation.

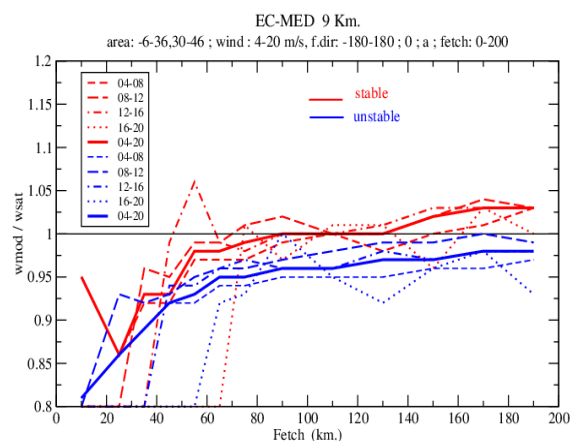


Figure 1 - Ratio model/scatterometer wind speeds as a function of “fetch”. The blue lines refer to unstable conditions, the red ones to stable ones.

4- Computer allowance.

All our experiments, being always in new conditions with continuous adjustments of the handling ECMWF software , requires a close interaction both with the local meteorologists to discuss the progressive steps of advance and the User Support team. They can be done only during our presence at ECMWF. It follows that no experiments have been done I these first months of 2020. We are waiting to see how the situation will evolve.