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 ……2019……..……

Project Title: …Fast solver for Wave modelling anf fitting of coefficient……..……

……..……

Computer Project Account: ……spcrduto……..……

Principal Investigator(s): ……Mathieu Dutour Sikiric……..……

……..……

Affiliation: ……Institut Rudjer Boskovic……..……

Name of ECMWF scientist(s) collaborating to the project (if applicable) ……none……..……

……..……

Start date of the project: ……2018……..……..……

Expected end date: ……2020……..……

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)		0		0
Data storage capacity	(Gbytes)		0		0

Summary of project objectives (10 lines max)

……The goal of the work is twofold: ……...……

……A) Examine parallelization and how to improve speed of fast solver.……

……B) Fit coefficients of the source term in order to get better forecasts……
…….

Summary of problems encountered (10 lines max)

……I could get acces to the ECMWF computers this time and could use it to access the MARS datasets which was great. Next I work on parallelization of implicit solver in wave models. Two points were achieved:
……a) parallelization of the multigrid in WaveWatch III program.
……b) Faster techniques for the implicit solver in the memory ordering.
……

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

……Further working on the implicit parallel solver. Another goal is to implement the coupling of the ALADIN meteorological model with the WWM III (Wind Wave Model).
……
……..……

List of publications/reports from the project with complete references

……The following paper was published during the duration of the project last year: M. Dutour Sikirić, Damir Ivanković, Aron Roland, Stjepan Ivatek-Šahdran, Martina Tudor, Operational Wave modelling in the Adriatic Sea, Pure and Applied Geophysics 175(11) (2018) 3801--3815
……

Summary of results

……
…Additional results that were obtained:

- The parallelization with the Gauss Seidel method was also used for Shallow water equation models which was significant progress.

-The importance of the ordering of directions, frequencies and geographical index in the parallelization. It turns out that the indexing (frequencies, direction, geography) is better than others. This is because at a given geographical point data in frequencies and directions are readily available and those are needed for source terms, refraction, frequency shifting. We need data at adjacent point only for geographical advection. By doing this we get a 20% speedup and this is why we use it in WWM III model now. Here we follow the WaveWatch and SWAN models. The only exception appears to be the WAM model.……