

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 2023

Project Title: RegiOnal climate simUlations over ItaLy: a focus on futurE exTreme weaTher Events (ROULETTE)

Computer Project Account: spitavol

Principal Investigator(s): Elenio Avolio

Affiliation: Institute of Atmospheric Sciences and Climate, National Research Council of Italy (ISAC-CNR)

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

Start date of the project: 01/01/2023

Expected end date: 31/12/2025

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)	/	/	10 million (SBU)	8500
Data storage capacity	(Gbytes)	/	/	30000	1350

Summary of project objectives (10 lines max)

The main objective of the project is to build a high-resolution database of present and future climate simulations, mainly devoted to the extreme weather events studies (flash floods, tornadoes, Mediterranean cyclones, heat waves, dust intrusions, etc.). Twenty years of simulations will be considered for both the current climate and for the future climate; for the latter, two scenarios will be taken into account.

Summary of problems encountered (10 lines max)

No issues were encountered but, rather, little changes were made to some initial run strategy decisions. In the initial draft of the project it was written that the global climate models (GCM) to be adopted (for the dynamical downscaling) would be chosen among several GCMs from CMIP6; EC-Earth model (0.7° resolution) was identified as a possible and preferable choice. At present, we have decided to use an available ensemble output based on 18 different GCMs (which also include EC-Earth) as large-scale forcing; the added value also lies in the fact that these fields are already BIAS-corrected (bias-correction done using ERA5 fields).

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

The project will continue according to the pre-established plans starting the simulations with the WRF regional model for the present climate. The ERA5 fields will be used as forcing for these runs. Once the runs referring to the present period have been completed, the simulations of the future climate will be started.

List of publications/reports from the project with complete references

There are no publications from the project so far.

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.

In the first 6 months of the project (from January 2023 up to June 2023) most of the work consisted in identifying the best configurations for the WRF regional model. The first large-scale fields for the IC/BC conditions have been downloaded. The very first phases of the activities concerned the installation of the latest version of the model, as well as the definition of the computational grids. After a few preliminary tests, the parameterization schemes considered most suitable for the long-term simulations were identified. Further tests were carried out for the optimal choice of the number of processors to use (scalability).