

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 2022.....

Project Title: Investigating the stratospheric dynamics of high-top climate model configurations.....

Computer Project Account: SPITSERV.....

Principal Investigator(s): Federico Serva.....
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Affiliation: Agenzia Spaziale Italiana (previously at Consiglio Nazionale delle Ricerche).....

Name of ECMWF scientist(s) collaborating to the project (if applicable) N/A.....
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Start date of the project: January 2022.....

Expected end date: December 2024.....

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)	N/A	N/A	5 000 000	0
Data storage capacity	(Gbytes)	N/A	N/A	10 000	0

Summary of project objectives (10 lines max)

In this project we aim to study the climatology and biases of high-top model configuration of the Integrated Forecasting System (IFS) used by the EC-EARTH climate model. This is made possible by the availability of specific diagnostics related with momentum and thermal budgets which are produced in the context of intercomparison exercises.

Summary of problems encountered (10 lines max)

None specifically, but as explained below the experimental protocol is currently being finalized so experiments have not been started yet.

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

The plan is to perform a set of ensemble simulations (e.g. three for experiment) to study the effects of nudging stratospheric circulation to realistic or climatological states, following the QBOi protocol being defined for Phase 2 of the project.

List of publications/reports from the project with complete references

None.

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.

No simulation was carried out so far, but the protocol for the, is close to finalization. The experimental design is similar to the one proposed by Stratospheric Network for the Assessment of Predictability (SNAPSI, <https://www.sparc-climate.org/activities/assessing-predictability/>) in terms of required outputs and nudging of variables. Three kind of simulations, where the tropical wind in the stratospheric canm be nudged, are planned. The control simulation is a free-running atmosphere-only run; this will be compared to another run where the quasi-biennial oscillation (QBO) winds are prescribed from observations (in the ‘full-field’ mode for EC-EARTH), and the last one where the QBO is artificially removed by nudging to a climatology. Among the scientific questions that will be addressed, we will focus on the tropical and extratropical teleconnection of the QBO and the momentum budget closure.