

REQUEST FOR A SPECIAL PROJECT 2024–2026

MEMBER STATE: CROATIA

Principal Investigator¹: Goran Gašparac

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Velika Gorica, Croatia

Address:

Other researchers: Bertrand BESSAGNET (European Commission, Joint Research Centre, Directorate C - Energy, Mobility and Climate, Clean Air and Climate Unit)

Project Title: Assessment of model responses to emission changes in the frame of the FAIRMODE CT9 platform.

To make changes to an existing project please submit an amended version of the original form.)

If this is a continuation of an existing project, please state the computer project account assigned previously.	SP	
Starting year: (A project can have a duration of up to 3 years, agreed at the beginning of the project.)	2024	
Would you accept support for 1 year only, if necessary?	YES <input checked="" type="checkbox"/>	NO <input type="checkbox"/>

Computer resources required for project year:	2024	2025	2026
High Performance Computing Facility [SBU]	5 000 000	5 000 000	5 000 000
Accumulated data storage (total archive volume) ² [GB]	3000	6000	9000

EWC resources required for project year:	2024	2025	2026
Number of vCPUs [#]	/	/	/
Total memory [GB]	/	/	/
Storage [GB]	/	/	/
Number of vGPUs ³ [#]	/	/	/

Continue overleaf.

¹ The Principal Investigator will act as contact person for this Special Project and, in particular, will be asked to register the project, provide annual progress reports of the project's activities, etc.

² These figures refer to data archived in ECFS and MARS. If e.g. you archive x GB in year one and y GB in year two and don't delete anything you need to request x + y GB for the second project year etc.

³ The number of vGPU is referred to the equivalent number of virtualized vGPUs with 8GB memory.

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Goran Gašparac

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Assessment of model responses to emission changes in the frame of the FAIRMODE CT9 platform.

Extended abstract

The sensitivity of air quality model responses to emission reductions when input data (e.g. emissions, meteorology and boundary conditions) or the model set-up configurations are changed is recognised as an important issue for the optimisation of model simulations. In the framework of FAIRMODE (Forum of Air Quality Modelling in Europe) and, in particular, in its Cross Cutting Task 9 (CT9), a dedicated intercomparison exercise has been designed. The goal is to evaluate the robustness of air quality models when studying emission scenarios/projections and to address the issue of the sensitivity of model responses to emission changes, in particular, to identify, study and possibly reduce discrepancies between models. This will provide robust support to model users and developers, and, consequently, policy makers. The emission reduction strategies will be applied and evaluated at urban scale using WRF-Chem model. This particular part of exercise will be focused over urban areas of Croatia.

The first preliminary results within the Fairmode CT9, based on emission reductions, show a large variability in the indicator values. While a variability below 10% between used numerical models is observed on Ozone concentrations during episodes, the results on indicators show a variability exceeding 100% and even more looking at the highest values. Also, applying emission reductions on several precursors at the same time seems more beneficial to reduce PM concentrations. Model responses on linearity and additivity show a clear impact of non-linear chemistry processes (particularly for Ozone).

Proposed work:

- Focus of all simulations over various urban areas in Croatia with WRF-Chem model. Due to expected large domain, validation of results will be done on large are, especially against rural background station measurement.
- Activities will be split into three phases (phase per year):
 - o Sensitivity analysis for PM concentration.
 - o Sensitivity analysis for O3 concentration.
 - o Additional analysis of individual processes that could drive sensitivity and provide guidance on how improvements can be made to the modelling platforms.

The work is part of Fairmode, no funds received. Proposed work for research purposes only.