

REQUEST FOR A SPECIAL PROJECT 2018–2020

MEMBER STATE:

JRC

This form needs to be submitted via the relevant National Meteorological Service.

Principal Investigator¹:

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Dr. Ernest Koffi
 (postdoc in the framework of Copernicus)

Project Title:

Improve European and global CH₄ and N₂O flux inversions

If this is a continuation of an existing project, please state the computer project account assigned previously.	SP _____	
Starting year: <small>(A project can have a duration of up to 3 years, agreed at the beginning of the project.)</small>	2018	
Would you accept support for 1 year only, if necessary?	YES <input checked="" type="checkbox"/>	NO <input type="checkbox"/>

Computer resources required for 2018-2020: <small>(To make changes to an existing project please submit an amended version of the original form.)</small>	2018	2019	2020
High Performance Computing Facility (SBU)	400000	400000	400000
Accumulated data storage (total archive volume) ² (GB)	400	800	1200

An electronic copy of this form must be sent via e-mail to:

special_projects@ecmwf.int

Electronic copy of the form sent on (please specify date):

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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 an annual progress report of the project's activities, etc.

² 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.

Principal Investigator: Dr. Peter Bergamaschi

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Extended abstract

All Special Project requests should provide an abstract/project description including a scientific plan, a justification of the computer resources requested and the technical characteristics of the code to be used.

Requests asking for 1,000,000 SBUs or more should be more detailed (3-5 pages).

Following submission by the relevant Member State the Special Project requests will be evaluated by ECMWF as well as the Scientific and Technical Advisory Committees. The evaluation of the requests is based on the following criteria: Relevance to ECMWF's objectives, scientific and technical quality, disciplinary relevance, and justification of the resources requested. Previous Special Project reports and the use of ECMWF software and data infrastructure will also be considered in the evaluation process.

Large requests asking for 10,000,000 SBUs or more will receive a detailed review by members of the Scientific Advisory Committee.

All accepted project requests will be published on the ECMWF website.

Project description

EC-JRC performs detailed inverse modelling studies of atmospheric greenhouse gases, using the TM5-4DVAR inverse modelling system. The objective of this special project (SP) is to extend and to further improve the estimates of global and European CH₄ and N₂O emissions, by (1) using new satellite retrievals, (2) using new European in-situ measurements from the Integrated Carbon Observation System (ICOS), (3) developing a coupled global / regional inversion system with high spatial resolution on the European domain.

Improve estimates of global CH₄ emissions using new satellite retrievals

The global CH₄ flux inversions (as provided by JRC in MACC-III [Bergamaschi et al., 2013] and ESA GHG cci project) will be further improved (using satellite data from GOSAT and Sentinel-5P), and extended in time coverage. These global flux inversions will also serve as benchmark for the evaluation of the CAMS CH₄ inversion / assimilation products in the framework of the support of JRC of the Copernicus services (administrative arrangement between JRC and DG GROW).

Improve estimates of European CH₄ and N₂O emissions using in-situ observations

The European CH₄ and N₂O flux inversions will be further improved using the operational ICOS data and extended in time coverage. These inversion will be further developed to support a European verification system of GHG emission inventories (supporting the transparency framework of the Paris agreement). The SP would also support the H2020 project Verify (Observation-based system for monitoring and verification of greenhouse gases; proposal currently under evaluation).

Develop coupled global / regional inversion system with high spatial resolution

TM5-4DVAR will be coupled with the regional FLEXPART/COSMO system [Henne et al., 2016; Bergamaschi and Brunner, 2015], driven by meteorological fields from the COSMO model at 7 km / 2 km. The overall inversion system will be based on a variational (4DVAR) system (as in TM5-4DVAR). The coupling between TM5-4DVAR and FLEXPART/COSMO will be based on the scheme of Roedenbeck et al. [2009]. Initially it is planned to use FLEXPART/COSMO simulations provided by EMPA (Dominik Brunner), while the baselines will be calculated from the new JRC European CH₄ and N₂O inversions described above using the Roedenbeck scheme.

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