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:	Chemistry and aerosol processes modelling within IFS in extension to CAMS activities
Computer Project Account:	SPNLMACC
Principal Investigator(s):	V. Huijnen
Affiliation:	Royal Netherlands Meteorological Institute (KNMI)
Name of ECMWF scientist(s) collaborating to the project (if applicable)	N/A
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)	1700	0	1900	0
Data storage capacity	(Gbytes)				

Summary of project objectives (10 lines max)

Within the Copernicus Atmosphere Monitoring Service (CAMS) modules for tropospheric and stratospheric chemistry, integrated in ECMWF's Integrated Forecasting System (IFS), are maintained and further improved within the CAMS tender on reactive gases modelling and assimilation, but does not cover extended scientific spinoff's from this work. This special project aims to provide us with in the computer resources needed for this. Topics under consideration are: 1) a further integration of tropospheric and stratospheric chemistry; 2) further integration of chemistry and aerosol subjects, particularly stratospheric aerosol and secondary organic aerosol; 3) Re-evaluate specific case studies, particularly the 2015 Indonesian fires. This special project is a follow-up of the previous one (2015-2017).

Summary of problems encountered (10 lines max)

No significant problems have occurred. Only limited resources have been used on account of this special project, and some activities have been postponed in alignment with particular CAMS project deliverables. Also developments have been accounted for through dedicated CAMS budget.

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

None – this special project will end in its current form.

List of publications/reports from the project with complete references

Banda et al., Monitoring emissions from the 2015 Indonesian fires using CO satellite data, Phil. Trans. Royal Soc. B: Biological Sciences 373(1760), 2018.

Hall, S. R., Ullmann, K., Prather, M. J., Flynn, C. M., Murray, L. T., Fiore, A. M., Correa, G., Strode, S. A., Steenrod, S. D., Lamarque, J.-F., Guth, J., Josse, B., Flemming, J., Huijnen, V., Abraham, N. L., and Archibald, A. T.: Cloud impacts on photochemistry: building a climatology of photolysis rates from the Atmospheric Tomography mission, Atmos. Chem. Phys., 18, 16809-16828, https://doi.org/10.5194/acp-18-16809-2018, 2018.

Huijnen, V., M. J. Wooster, J. W. Kaiser, D. L. A. Gaveau, J. Flemming, M. Parrington, A. Inness, D. Murdiyarso, B. Main and M. van Weele. Fire carbon emissions over maritime southeast Asia in 2015 largest since 1997. Sci. Rep. 6, 26886; doi: 10.1038/srep26886, 2016.

Huijnen, V., Pozzer, A., Arteta, J., Brasseur, G., Bouarar, I., Chabrillat, S., Christophe, Y., Doumbia, T., Flemming, J., Guth, J., Josse, B., Karydis, V. A., Marécal, V., and Pelletier, S.: Quantifying uncertainties due to chemistry modelling – evaluation of tropospheric composition simulations in the CAMS model (cycle 43R1), Geosci. Model Dev., 12, 1725-1752, https://doi.org/10.5194/gmd-12-1725-2019, 2019.

Inness, A., Ades, M., Agustí-Panareda, A., Barré, J., Benedictow, A., Blechschmidt, A.-M., Dominguez, J. J., Engelen, R., Eskes, H., Flemming, J., Huijnen, V., Jones, L., Kipling, Z., Massart, S., Parrington, M., Peuch, V.-H., Razinger, M., Remy, S., Schulz, M., and Suttie, M.: The CAMS reanalysis of atmospheric composition, Atmos. Chem. Phys., 19, 3515-3556, https://doi.org/10.5194/acp-19-3515-2019, 2019.

Rémy, S., Kipling, Z., Flemming, J., Boucher, O., Nabat, P., Michou, M., Bozzo, A., Ades, M., Huijnen, V., Benedetti, A., Engelen, R., Peuch, V.-H., and Morcrette, J.-J.: Description and evaluation of the tropospheric aerosol scheme in the European Centre for Medium-Range Weather Forecasts (ECMWF) Integrated Forecasting System (IFS-AER, cycle 45R1), Geosci. Model Dev., 12, 4627–4659, https://doi.org/10.5194/gmd-12-4627-2019, 2019.

Sander, R., Baumgaertner, A., Cabrera-Perez, D., Frank, F., Gromov, S., Grooß, J.-U., Harder, H., Huijnen, V., Jöckel, P., Karydis, V. A., Niemeyer, K. E., Pozzer, A., Riede, H., Schultz, M. G., Taraborrelli, D., and Tauer, S.: The community atmospheric chemistry box model CAABA/MECCA-4.0, Geosci. Model Dev., 12, 1365-1385, https://doi.org/10.5194/gmd-12-1365-2019, 2019.

Wooster, M.J., Gaveau, D.L.A., Salim, M.A., Zhang, T., Xu, W., Green, D.C., Huijnen, V., Murdiyarso, D., Gunawan, D., Borchard, N., Schirrmann, M., Main, B., Sepriando, A. New tropical peatland gas and particulate emissions factors indicate 2015 Indonesian fires released far more particulate matter (but Less Methane) than current inventories imply. Remote Sensing, 10 (4), 2018.

Summary of results (from July 2019 to June 2020)

It has been decided that all computing resources needed to execute the research and development activities over the last years have been accounted on the CAMS budget, as allocated to the CAMS_42 tender, considering that CAMS is also the primary beneficiary from all activities. Therefore also no results are shown in this special project. We also will not request for continuation in the next year.