

# REQUEST FOR A SPECIAL PROJECT 2013–2015

**MEMBER STATE:** Netherlands

Please provide the information requested for each special project you wish to propose for **2013-2015**.

**Principal Investigator<sup>1</sup>:** Dr. F.M. Selten

**Affiliation:** Royal Netherlands Meteorological Institute

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**Address:** Wilhelminalaan 2, De Bilt, Netherlands

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**E-mail:** selten@knmi.nl

**Other researchers:** C. Lacagnina

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**Project title:** The role of clouds in model bias and climate sensitivity

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**Project description:** *An electronic copy of the project description/extended abstract must be sent via e-mail to:*

*special\_projects@ecmwf.int.*

Electronic copy of the extended abstract sent on: May 3, 2012  
(specify date)

*A copy of the project description/ extended abstract must be attached.*

<b>Estimate of computer resources for 2013-2015:</b>	<b>2013</b>	<b>2014</b>	<b>2015</b>
High Performance Computing Facility (units)	300000		
Data storage capacity (total) (Gbytes)	2000		

Is this a continuation of an existing project:	YES <input checked="" type="checkbox"/>	NO <input type="checkbox"/>
If YES, please state the computer project account assigned for 2013:	<b>SP nlccf</b>	

*Continue overleaf*

<sup>1</sup> 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.

**Principal Investigator:** Frank Selten

**Project Title:** The role of clouds in model bias and climate sensitivity

## Extended abstract

In this special project we plan free climate simulations with the IFS model and the coupled EC-Earth model to evaluate the role of clouds in the climate system in the present-day climate and a perturbed climate with increased levels of greenhouse gasses. The goal is to increase our understanding of the origin of model systematic error, the role of clouds herein, the interplay between clouds and the large-scale circulation, the effect of clouds in the response of the climate to increased greenhouse gasses in order to contribute to a more realistic description of cloud-related processes in IFS/EC-Earth.

This work is done in the context of the European Union Cloud Intercomparison, Process Study and Evaluation project (EUCLIPSE, <http://euclipse.eu>) that has just started, lasts for four years and is led by KNMI. Two PhD's have started to work on this project, Sarah Dal Gesso and Carlo Lacagnina. Sarah will work with the single column version of IFS to evaluate simulations against Large Eddy Simulations and data from field campaigns. Carlo will work on the topics of this special project.

Within EUCLIPSE coordinated experiments with the leading European climate models will be conducted and in this special project we will employ modified versions of EC-Earth and IFS to perform these runs. We are currently incorporating the CFMIP observational simulator package (COSP, [cfmip.metoffice.com/COSP.html](http://cfmip.metoffice.com/COSP.html)) in the IFS/EC-Earth code to enable a faithful evaluation between simulated cloud fields and as observed by satellites. Sensitivity experiments will be conducted to evaluate the impact of modifications to the parameterizations of cloud-related processes that are suggested by the LES and SCM studies in the 3D context of IFS/EC-Earth.

## Summary of project objectives

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Implementation of satellite simulator software COSP into IFS for Cloudsat radar, Calipso lidar and ISCCP.

AMIP runs with observed SSTs to evaluate the cloud fields of ECEARTH with satellite observations  
AMIP runs with perturbed SSTs to evaluate the response of the cloud fields and determine the cloud radiative feedback