REQUEST FOR A SPECIAL PROJECT 2013–2015

MEMBER STATE: European Commission Joint Research Centre

Principal Investigator[1]: Alessandro Dosio

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Project Title: Climate change impacts on the European ecosystems and assessment of forest fires risk

If this is a continuation of an existing project, please state the computer project account assigned previously.	**SPJRCFIR**	
Starting year: (Each project will have a well defined duration, up to a maximum of 3 years, agreed at the beginning of the project.)	2011	
Would you accept support for 1 year only, if necessary?	YES X	NO ☐

Computer resources required for 2013-2015: (The maximum project duration is 3 years, therefore a continuation project cannot request resources for 2015.)	**2013**	**2014**	**2015**
High Performance Computing Facility (units)	300,000		
Data storage capacity (total archive volume) (gigabytes)	200		

*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): 16/04/2012

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.

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Extended abstract

The link of forestry with climate change is twofold, because they act as sinks for carbon dioxide, but, at the same time, they are also very vulnerable to changes in temperature, precipitation and extreme weather events which can have destructive impacts and reduce the carbon sequestration potential of the forest.
Although it is generally recognized that the occurrence of forest fires in Europe is due mainly to causes of an anthropogenic nature, the total burned area changes significantly from year to year largely because of weather conditions. At the same time, especially in Mediterranean ecosystems fire is essential for maintaining biodiversity and oppressing all fires can result in excessively large fires once a there is a fire outbreak.
The projected decrease in summer precipitation in southern Europe, the increase in the frequency of summer droughts will probably induce greater risks of forest fires (IPCC, 2007).
Changes in fire regimes may have strong impacts on natural resources and ecosystem stability, with consequent direct and indirect economic losses. On other hand active forest and fire management practices can counteract the impacts of a changing climate to some extent.
The objective of the study is to provide a European assessment of the potential effects of climate change on green house gases emissions from forest fires with respect to a range of climate change scenarios.
In particular we will structure our projects in the following three phases:

First a new forest fire module recently developed (Kloster et al, 2010) will be implemented in the land surface/biogeochemistry model CLM4.0. The previous version of this model (CLM 3.5) was successfully coupled to the Regional Climate Model COSMO-CLM (or CCLM) in the framework of the ECMWF Special Project SPJRCCLM2 (Coupling a Regional climate Model to a biogeochemical land-surface model in the study of climate change impacts on the European ecosystems). CLM4.0 can however also run as stand-alone model, when forced by appropriate weather data (either observations or model output)

Second, CLM4.0 with the new forest fire will be forced by observed climate (e.g. ERA40 or ERA-interim) and tested against an extensive dataset of burn are and fire events managed by the European Forest Fires Information System (EFFIS) managed by the JRC and against the Global Fire Emission Database (GFEDv3, van der Werf *et al.*, 2010)

Third, CLM4.0 will be used to assess risk of forest fires due to climate change as predicted by several RCMs in the recently concluded FP6 project ENSEMBLES to study the influence of the internal variability of the driving climate models on the risk of forest fires.

Kloster et al., 2010: Fire dynamics during the 20th century simulated by the Community Land Model, Biogeosciences Disc., 2010

van der Werf, et al., Global fire emissions and the contribution of deforestation, savanna, forest, agricultural, and peat fires (1997-2009), ATMOSPHERIC CHEMISTRY AND PHYSICS DISCUSSIONS, 10, 16153-16230, doi:10.5194/acpd-10-16153-2010, 2010, online paper