



European Commission's 7th Framework Programme
Grant Agreement No. **226520**

Project acronym: **COMBINE**

Project full title: **Comprehensive Modelling of the Earth System for Better
Climate Prediction and Projection**

Instrument: Collaborative Project & Large-scale Integrating Project

Theme 6: *Environment*

Area 6.1.1.4: *Future Climate*

ENV.2008.1.1.4.1: *New components in Earth System modelling
for better climate projections*

Start date of project: 1 May 2009

Duration: 48 Months

Milestone Reference Number and Title:

M1.1. Prototype of carbon and nitrogen included in biogeochemistry models

Lead work package for this milestone: WP1

Organization name of lead contractor for this milestone: METO

Due date of milestone: October 2010

Actual submission date: October 2010.

The objectives of COMBINE WP1 are:

- To deliver new carbon and nitrogen cycle components in existing state-of-the-art ESMs
- To include terrestrial emissions of methane in order to evaluate their with feedback with climate change
- To assess and evaluate the new components and hence constrain interactions and feedbacks

This milestone relates to the work undertaken to fulfil task T1.1: *“Incorporate new Earth System components into ESMs. In the first phases, the following new components will be implemented in the ESMs: Inclusion of land-use change, prognostic land and ocean nitrogen cycle, permafrost.”*

Most of the required component coupling has been completed although for technical reasons some coupling has been performed into the offline land-surface model of the ESM in question (see table 1). Full coupling to the ESM in this case is underway.

Full details of the work undertaken and testing of components is given in deliverable report, D1.1 along with any explanation for any components not yet coupled to the ESMs.

<i>Model</i>	<i>process</i>	<i>Fully coupled</i>	<i>Offline coupled</i>	<i>Not yet coupled</i>
HadGEM	Land Use	X		
	Land N		X	
	Ocean N			X
	Permafrost		X	
	Wetlands methane	X		
	Fire	X		
IPSL-ESM	Land Use	X		
	Land N		X	
	Ocean N	X		
	Permafrost		X	
	Wetlands methane		X	
	Fire			
COSMOS	Land Use	X		
	Land N	X		
	Ocean N	X		
EC-Earth	Land Use	X		
	Permafrost			X
	Wetlands methane			X
CNRM	Land Use	X		
NorESM	Land Use		X	
	Ocean N	X		

Table 1. Summary of status of coupling of ES components in project ESMs.