



LIFE Project Number

LIFE07 ENV/FIN/000133

4th Monitoring Progress Report

Covering the project activities from 08/10/2010 to 15/04/2011

Reporting Date

28/04/2011

LIFE+ PROJECT NAME or Acronym

Monitoring and assessment of carbon balance related phenomena in Finland and northern Eurasia

Data Project

Project location	Helsinki
Project start date:	01/01/2009
Project end date:	31/12/2012
Total budget:	2155627 €
EC contribution:	1046759 €
(%) of eligible costs	49.09

Data Beneficiary

Name Beneficiary	Ilmatieteen laitos
Contact person	Dr. Ali Nadir Arslan
Postal address	Erik Palménin aukio 1, FI-00101, Helsinki, Finland
Telephone	+358-50-320 3386
Fax:	+358-9-1929 4603
E-mail	ali.nadir.arslan@fmi.fi
Project Website	snowcarbo.fmi.fi

Summary of Progress

The general progress in the project has been very good. All activities within the Actions have been started on time and the progress is inline with the planned project schedule.

The project objectives and the work plan are assessed continuously by the project team during the project meetings including management and steering group meetings. All project objectives are so far found fully viable.

The activities of Action 1 such as arrangements of the official project meetings, coordination and monitoring of the project progress, preparation of the project deliverables, and monitoring of the project expenses are according to the project plan.

Processed satellite data retrievals (digital maps) of the following (snow water equivalent (30 years), on-set of snow melt (30 years), snow clearance (30 years), soil freezing (10 years)) weekly products during snow season (September to May) are ready. Earth observation-based extended GMES service dataset for years 2001 – 2010 has been processed and details of the action are described in the deliverable documents of Action 2 & 3.

Gridded time-series of meteorological data covering the whole model domain is adopted from the ECMWF database. Presently the time-coverage is from 2001 to 2007. The remaining years will be adopted before the final evaluation and production runs of the model results. See the 1st and 2nd data reports from Action 4 for details. CO₂ and energy flux measurements have been running as planned. Data availability from different sites varies according to site-specific post-processing schedules.

In Action 5, 4 field measurement campaigns at Sodankylä were executed 2 in 2009 and 2 in 2010.

In Action 6, methods which are used in Action 8 are mostly achieved. JSBACH model development for producing CO₂ fluxes on the way. Transport software REMOTracer implemented and tested in FMI system. Software modules for assimilation of carbon dioxide concentration data for constraining simulations are implemented and tested in FMI computing system. Flux and concentration systems are validated according to Fluxnet and GAW networks' methodologies.

Soil-Vegetation-Atmosphere carbon exchange simulation module, which use high resolution land-use and vegetation data together with environmental parameters obtained via remote sensing and traditional sources are applied for the modelling framework. JSBACH models refinement is on the way.

In Action 7, unfiltered time-series of SCA and NDVI in a gridded form were processed for the years 2001-2008 from MODIS satellite data and are described in the deliverable 1st EO-data document (years 2001-2008). Features of vegetation were extracted for 2001-2008.

First results of methodology demonstration and validation for selected time periods/regions are ready and documented in Action8.

In action 9, analysis of the significance of the effect of snow coverage and NDVI- index anomalies to carbon flux completed (Time series of local areal, e.g. watershed, statistics of snow coverage). Comparisons of NDVI (or other vegetation indices) and phenological observations completed. Comparisons between the snow cover from vegetation-climate models and snow cover from remote sensing and in-situ data first results are ready and reported. Data are shared through three media: 1) web-site for project documents; 2) FTP- for project intermediate data (e.g. satellite products, modelling data) and 3) using external hard

drives for satellite image data. Protocol for data sharing completed. Protocol for data archiving completed. EO based services are in use and feedbacks are collected from snow, vegetation and land cover data. First evaluation of benefits and drawbacks of the use of the EO based services are evaluated and reported.

In Action 11, evaluation on the land cover needs was made. Results were reported. Different datasets were produced and accuracy assessments were made. More detailed land cover mapping was produced for northern-Finland covering Sodankylä-Pallas area. Field data collected and accuracies were calculated and reported. Already available land cover data sets have been demonstrated and evaluated.

List of main achievements from SnowCarbo project can be listed as follows,

- Snow water equivalent (30 years), on-set of snow melt (30 years), snow clearance (30 years), soil freezing (10 years) weekly products
- Implemented a modified MODIS cloud masking algorithm and deployed a new data processing server. This increases the quality of raw time-series data.
- Spectral measurements from the winter field campaigns were processed. The measurements are used to aid the interpretation of NDVI and SCA time-series and in accuracy assessments.
- Autumn field campaign was conducted for land cover data validation and accuracy assessment and spectral measurements of vegetation.
- Carbon balance related features, like growing season beginning and end dates, were analyzed from the CO₂ flux measurements.
- A method for the extraction of start of season in boreal coniferous forests from NDVI time-series was developed.
- The start of the growing season, derived from CO₂- flux measurements, was compared with the start of the growing season from NDVI- time-series from satellite data. The two datasets show good correlation.
- The up-to-date versions of both REMO and JSBACH models have been one-way coupled, and the models are now properly running on the FMI supercomputers, producing regional present day climates and CO₂ fluxes with all the different land cover datasets currently available.
- Planning of system functionality validation has been started for the model domain covering Scandinavia and Baltic countries.
- Tools for data extraction from REMO- model data format have been created. First comparisons of modeled snow cover and satellite data time-series are currently being compiled for evaluation of the model performance.
- Up-to-date sets of Nordic land cover information based on Globcover v2, CORINE2006 and TERRA MODIS data have been produced and reported for carbon balance modeling purposes (Törmä & al. 2010. Revision the land cover and use classification of northern areas for climate modeling, SPIE European Remote Sensing, Toulouse 20.-23.9.2010.)