



LIFE Project Number

LIFE07 ENV/FIN/000133

3rd Monitoring Progress Report

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

Reporting Date

20/10/2010

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

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List of abbreviations

AMSR-E	Advanced Microwave Scanning Radiometer – Earth Observing System
ASCAT	Advanced Scatterometer
ASD	Analytical Spectral Device
AVHRR	Advanced Very High Resolution Radiometer
CEA-LSCE	Commissariat à l'énergie atomique – Laboratoire des Sciences du Climat et de l'Environnement
CO ₂	Carbon dioxide
CORINE	Coordination of information on the environment
EC	European Commission
ECMWF	European Centre for Medium-Range Weather Forecasts
ENVISAT	Environmental Satellite
EO	Earth Observation
ESA	European Space Agency
EU	European Union
FMI	Finnish Meteorological Institute
GAW	Global Atmospheric Watch
GMES	Global Monitoring of Environment and Security
GSE	GMES Services Element
JSBACH	Jena Scheme for Biosphere-Atmosphere Coupling in Hamburg
MERIS	Medium Range Imaging Spectroradiometer (onboard ENVISAT satellite, ESA)
mmu	minimum mapping unit
MODIS	Moderate Resolution Imaging Spectroradiometer (onboard Terra and Aqua Satellites, NASA)
NDVI	Normalized Difference Vegetation Index
QuikSCAT	Quick Scatterometer
SCA	Snow Covered Area
SMMR	Scanning Multichannel Microwave Radiometer
SSM/I	Special Sensor Microwave Imager
SWE	Snow Water Equivalent
SYKE	Suomen ympäristökeskus (Finnish Environmental Institute)

1 Progress

1.1 Actions

1.1.1 Action 1: Project management and monitoring

Following activities can be listed as main progresses of action1:

- 2nd Monitoring report of steering group (29/04/2010)
- 18 month progress report (30/06/2010)
- Project Meeting (27/08/2010)
- 3rd Management Meeting (16/09/2010)
- Project Meeting (07/10/2010)
- 3rd Steering Group Meeting (13/10/2010)
- 3rd Monitoring report of steering group (DRAFT)
- SnowCarbo webpage updates

Main achievements are as follow

- Implemented a improved cloud masking algorithm and deployed a new data processing server
- Carbon balance related features, like growing season beginning and end dates, were analyzed from the CO₂ flux data for various sites for a comparison with similar information extracted from time series of NDVI
- Spectral measurements from the winter field campaign were processed and utilized as reference data in the interpretation of satellite image time-series for detecting the spring phenological events. Autumn field campaign was conducted for land cover data validation and accuracy assessment and spectral measurements of vegetation.
- 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.
- A method for the extraction of start of season in boreal coniferous forests from NDVI time-series was developed.
- 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 landcover 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.)

1.1.2 Action 2: Satellite data processing by FMI

Prototype datasets for weekly gridded SWE are now available for a 18-year period (1992-2009); the production algorithm and database for the final 30 year dataset (1978-present) is being finalized and will be available during October 2010

1.1.3 Action 3: Acquisition and extension of GMES-services GSE Polar View and GSE Land

Status, winter 2010

- Processing of the datasets for 2009 and 2010 is on-going
- New server for data processing has been set up and is in use
- Example dataset using the improved cloud masking algorithm were delivered for Action 7

Progress, spring and summer 2010

- Implementation of modified MODIS cloud masking algorithm, this may improve the quality of raw time-series data used by Action 7
- Collection of raw data for 2009-2010

Future tasks, winter 2010 – spring 2011

- Deliverable: 2nd document on existing datasets (30.11.2010)
- Processing of revised dataset with improved cloud masks

Challenges

- IT reform at the institute has been delayed and we still relying on the old storage system. This may cause minor delays in the data processing. According to the current schedule, the new storage should be available by 18.10.

1.1.4 Action 4: In-situ data collection and processing by FMI

The general objective of Action 4 (In-situ data collection and processing by FMI) is to prepare two data sets: the input data and the validation data. The input data set consists of initial and boundary forcing data for the models REMO and ECHAM5 (see Action 6). The validation data (i.e. the in situ data set) such as, CO₂ fluxes and concentrations, will be used for assessing the reliability of the model predictions. The tasks of Action 4 have progressed as planned. The initial and boundary data field sources for the models have been selected. The measurements of the validation data has continued at the flux and concentration measurement stations of Finnish Meteorological Institute. The oldest flux sites have been running over 10 years and during that time there have been slight changes in the flux calculation programs. The data from these sites, Sodankylä and Kaamanen, have been recalculated according to the latest post-processing procedures in order to ensure homogeneous datasets. The processing of the data into a form appropriate for model evaluation have been started and will be continued during the latter half of 2010. Carbon balance related features, like growing season beginning and end dates, were analyzed from the CO₂ flux data for various sites for a comparison with similar information extracted from time series of NDVI in Action 7. No major problems are foreseen in tasks of next 6 months.

1.1.5 Action 5: In-situ data collection and processing by SYKE

Status of this action winter 2010

- Winter field campaign consisted of one week of measurements in Sodankylä Arctic Research Centre of FMI and two days in the vicinity of Helsinki. Reflected solar spectrum was measured for error estimation of the snow cover satellite product. Additionally information on the snow cover was collected.
- A new soil database, provided by Geological Survey of Finland was being incorporated to the SYKE databases.

Progress in spring and summer 2010

- Data from the winter field campaign was processed.
- The winter field data was used for interpretation of the satellite driven time-series of the melting snow cover (in Action 7)
- During autumn field campaign, the land surface parameters used in the land cover classifications were measured in-situ for accuracy assessment (for Action 11); reflected solar spectrum was measured over an open fen for reference of satellite interpretation of the phenological cycle (for Action 7).

Next

- Report on the collected datasets.
- Provide data in needed format for other actions.



Figure 1.1. Field measurements with ASD (Analytical Spectral Device) HandHeld in winter in Sodankylä and in the autumn in Karigasniemi

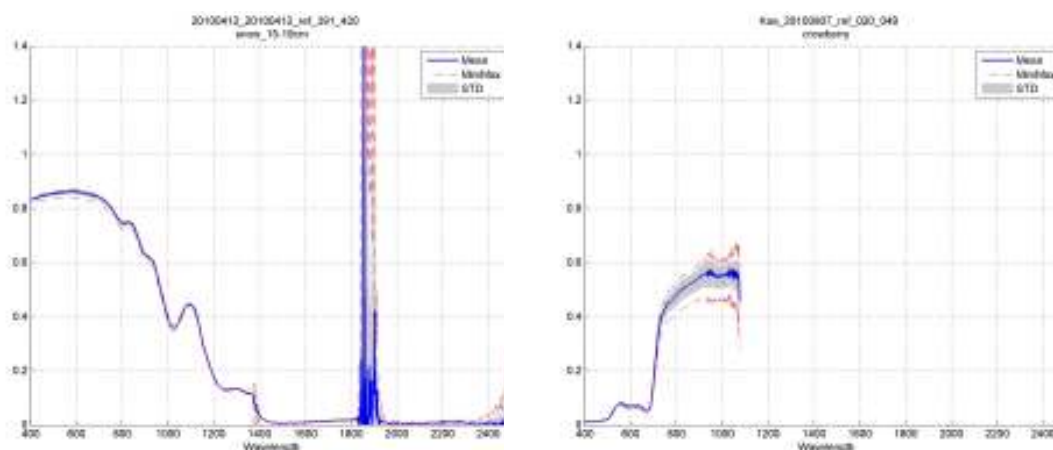


Figure 1.2. Spectrometer measurements from snow cover (left) and vegetation in the autumn, crowberry (right).

1.1.6 Action 6: Methodology development and implementation by FMI

Before the 2nd steering group meeting, the degree of coupling between the climate model (REMO) and the land surface model (JSBACH) was decided.

Furthermore, before the 2nd steering group meeting, the required boundary data pre-processing routines, in order to create boundary fields for regional domain, were acquired, their use learned and the required steps were taken for creation of a trial set of data for the year 2002.

The REMO2008 tracer model was subsequently run with the relevant boundary conditions and its functioning was ensured. The JSBACH model domain was also restricted to that of REMO.

In last 6 months, REMO runs, in order to produce detailed climates, were performed with surface parameter maps based on land use classifications from Action 11. To assess the influence of surface characteristics the runs were done in climate mode in which the simulations are forced with six-hourly climate data at the domain boundaries.

The JSBACH model was updated to a current version. Routines for processing the REMO output climate data into a form suitable for use as JSBACH input were developed automating the data flow between the two models. JSBACH gets daily input data from REMO runs whereas JSBACH output frequency can be adjusted.

The first progress report on methodology was written as scheduled.

The next steps of the Action 6 will include 1) running the coupled JSBACH-REMO model with different land use data, 2) utilization of the data from actions 3, 4, 5 and 11 will be revised, and 3) the JSBACH output will be processed into a form appropriate for subsequent tracer-REMO runs.

1.1.7 Action 7: Methodology development and implementation by SYKE

Status of action in winter 2010

- Unfiltered time-series of SCA and NDVI, in a gridded form, were processed for the years 2001-2008 from MODIS satellite data.
- Daily composites of NDVI and SCA products were calculated after masking of clouds.

Progress during spring and summer 2010

- Filtered and gap-filled time series of NDVI and SCA were provided for homogenous sites of selected land cover types (coniferous forest, broadleaved deciduous trees, wetland and agricultural area) near in situ measurement sites.
- A method for the detection of start of the growing season, defined as beginning of photosynthetic activity, was developed for coniferous forest based on time-series of NDVI. Comparisons of satellite-derived start of season for the period 2001 - 2008 with in situ dates, derived from CO₂ flux measurements, revealed high correspondence for 3 coniferous sites in Finland.
- Start of growing season of broadleaved deciduous forest and wetland sites was determined from time-series of Normalised Difference Water Index (NDWI) based on the method developed by Delbart et al. (2005).
- Beginning of height growth of new shoots in coniferous forest was extracted from NDWI time-series. Satellite-derived start of growth of new shoots showed good correspondence with phenological observations of pine trees.

Deliverables and milestones from April to October 2010

- Filtered time-series with preliminary techniques and progress report on filtered time-series (years 2001 – 2008) was completed by 31/05/2010.
- Features were extracted from time-series and progress report on extracted features (years 2001-2008) was completed by 31/08/2010.

Next

- Further work on filtering of time-series and second progress report on filtered time-series (30/11/2010)
- Processing of time-series for years 2009 – 2010 (31/03/2011)

References

Delbart, N., Kergoat, L., Le Toan, T., Lhermitte, J., Picard, G., 2005. Determination of phenological dates in boreal regions using normalized difference water index. *Remote Sensing of Environment* 97, 26-38.

1.1.8 Action 8: Demonstration and validation by FMI

This action was officially started on 1st of January 2010. Validation of climate and carbon balance model results produced in Action 6 has been started. All the flux and concentration data is processed and checked for quality according to standards developed in the international measurement networks sites.

Performed tasks since 2nd steering group meeting:

System validation has been started for the Nordic model domain with comparison of climates predicted by different land use maps and climate model running modes.

The next tasks will include

- Estimation of carbon balance for Baltic EU area with the modeling framework developed in Action,
- Production of preliminary demonstration report. Overall system validation will be developed according to the findings from comparison between modeled and measured CO₂ balances.

1.1.9 Action 9: Demonstration and validation of EO services

Status of this action winter 2010

- Output from the first preliminary model runs were used to start the development of data-handling tools for model vs. in-situ or remote sensing data comparisons.
- Next steps depended on receiving the output from the first models runs with REMO-regional climate model (Action 6).

Progress in spring and summer 2010

- Tools have been developed for extraction of time-series data from REMO- output model format.
- First REMO- model results were delivered (Action 6)

Next

- Comparison of fractional snow cover to modelled snow cover
- Comparison of NDVI- time-series to vegetation outputs from JSBACH

1.1.10 Action 10: Generation of carbon assessment end-products

Activities will be started in 2012.

1.1.11 Action 11: Evaluation of required Northern-Eurasian land cover information

Status of this action winter 2010

Detailed land cover information covering intensive in-situ monitoring areas using satellite data (IRS P6 LISSIII, SPOT 4 XS) together with ancillary GIS and in-situ data were produced. This included:

- CORINE land covers compatible data covering northern Finland (national lc)
- Tailored land cover data sets covering Sodankylä and it's surroundings (Local lc)

Progress in spring and summer 2010

- Surface parameter forest ratio in Olsson data was compared within Finland using CORINE2006 data sets.
- Three different sets of regional land cover data are completed and delivered for modelling.
- Conference paper submitted and presented (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.)
- Field measurement campaign organised and completed (5.-9.9.2010) for accuracy assessment purposes.

Next

- Report on data production and accuracy; suitability for carbon balance modelling
- Possible enhancement of land cover data according to modeling experiences/needs

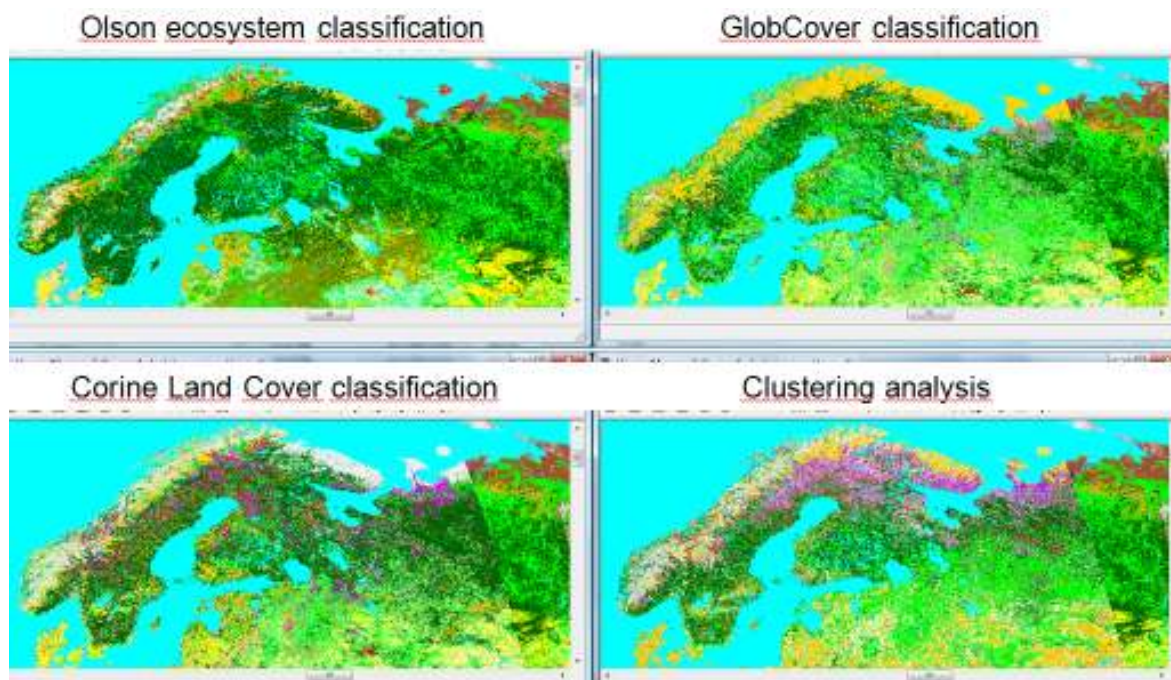


Figure 1.3. Regional land cover data sets for Snowcarbo produced using Globcover, CORINE2006 and MODIS data.

1.1.12 Action 12: Dissemination

Dissemination in the framework of SnowCarbo primarily means the distribution of the end products from Action 10. This will start during the last year of the project in 2012.

Since 2nd steering group meeting:

- Kari Luojus, Jouni Pulliainen, Chris Derksen, Helmut Rott, Thomas Nagler, Rune Solberg, Andreas Wiesmann, Sari Metsämäki, Eirik Malnes and Bojan Bojkov, "Investigating the feasibility of the globsnow snow water equivalent data for climate research purposes" IGARSS 2010, July 25-30, 2010, Hawaii-USA (presented).
- Törmä, Härmä, Markkanen, Hatunen, Arslan: "Revising the land cover and use classification of northern areas for climate modeling", SPIE European Remote Sensing Symposium, September 2010 Toulouse (presented)

- ESA-iLEAPS-EGU joint Conference on "Earth Observation for Land-Atmosphere Interaction Science" 3-5 November 2010, ESA Esrin, Frascati : 2 oral presentations + poster (accepted)
- AGU Fall Meeting 2010, 13-17 December 2010, San Francisco, USA: poster (submitted)
- The SnowCarbo web pages have been updated.

1.1.13 Action 13: Auditing

This action is only performed at the end of the project.

1.1.14 Action 14: Project advisory co-operation

The work presented here has been conducted by Martin Menegoz, a post-doctoral researcher which has been recruited within the action 14 of the Snowcarbo project. This work is centered on the modeling of the snow cover in the Arctic region, using the global land surface model ORCHIDEE (Krinner et al., 2005), component of the coupled climate-aerosol-chemistry model LMDZ-INCA. More precisely, this work aims at studying the impact of the aerosol deposition on the snow cover. As a first step, a budget of all the aerosol sources and sinks was made in the Arctic atmosphere (Menegoz et al., in prep.). In a second step, a representation of the black carbon and the dust content in the snow has been implemented in ORCHIDEE. A parameterization calculating the snow albedo was also integrated into the model. It is based on the work of Warren and Wiscombe (1980) and Krinner et al. (2006). A one-year ORCHIDEE simulation is currently under validation, focusing on the ability of the model to describe the black carbon and dust content in the snow, and the albedo variations linked to the aerosol deposition. Moreover, the snow extent and snow depths modeled with ORCHIDEE in the Northern hemisphere were validated thanks to comparisons with Canadian Meteorological Center data (see Brasnett, 1998 for a presentation of the data). In addition to this study, this land surface model is now used to evaluate the impact of snow conductivity variations (linked to an evolution of the vegetation, for example) on the soil temperature, and therefore on the carbon stocked into the permafrost (tasked performed by I. Gouttevin, M. Menegoz, G. Krinner and F. Dominé). The first results of this study were presented at the International Polar Year Oslo science conference (Domine et al. 2010). Several 100-year simulations are currently running to evaluate the sensitivity of the soil carbon stocks to snow conductivity variations over the twentieth century.

References:

- Brasnett, B, 1998 : A Global Analysis of Snow Depth for Numerical Weather Prediction, *Jour. of appl. meteorol.* 38, 726-740.
- Florent Domine, Gerhard Krinner, Martin Menegoz, Josué Bock, Jean-Charles Gallet, Kati Anttilaa, 2010, Snow-climate feedbacks driven by changes in snow thermal conductivity, IPY Oslo science conference, June 2010.
- Krinner, G. N. Viovy, N. de Noblet-Ducoudré, J. Ogé, J. Polcher, P. Friedlingstein, P. Ciais, S. Sitch, and I. C. Prentice, 2005: A dynamic global vegetation model for studies of the coupled atmosphere-biosphere system. *Glob. Biogeochem. Cyc.*, 19, GB1015.
- Krinner, G., Boucher, O., Balkanski, Y., 2006: Ice-free glacial northern asia due to dust deposition on snow, *climate dynamics*, 27, 613-625.

- Ménégoz, M., Voltaire, A., Teyssède, H., D. Salas y Melia and Peuch, V-H : Where do aerosols come from and how long do they stay in the Arctic region, in preparation.
- Warren, S.G. and Wiscombe, W.J. , 1980: A Model for the Spectral Albedo of Snow. I: Snow Containing Atmospheric Aerosols, Jour. of the Atmosph. Sci., Vol 37, 2734-2745.

1.1.15 Action 15: After Life+ Communication plan

The detailed plan for communications and actions after the end of the Life+ project will be made during the last project year in 2012.

1.2 Availability of appropriate licences and authorisations

All necessary software licences and authorisations to use observation data and models are available for the project team.

1.3 Envisaged progress until next report

This section provides an overview of the SnowCarbo project progress. Table 1 provides a detailed list of the envisaged activities for SnowCarbo Actions for 1.1.2009-31.12.2011

Table 1. SnowCarbo activity list.

Envisaged activities for SnowCarbo Actions for 1.1.2009-31.12.2011		
(Deliverable items marked with red text color)		
Action 1: Project management and monitoring		
Activity	Due date	Completion (%)
• 1st Project brochure	30/03/2009	100%
• Inception report	30/06/2009	100%
• Answers to EC comments on Inception Report	15/09/2009	100%
• Project meeting	18/09/2009	100%
• 1 st Management Board meeting	14/10/2009	100%
• Project meeting	28/10/2009	100%
• 1 st Steering Group meeting	13/11/2009	100%
• 1 st Monitoring Report of Steering group	27/11/2009	100%
• Project meeting	27/11/2009	100%
• Quarterly meeting	18/12/2009	100%
• First-year progress report	31/12/2009	100%
• Project meeting	25/01/2010	100%

• Project meeting	10/03/2010	100%
• 2 nd Management Board meeting	10/03/2010	100%
• Quarterly meeting	08/04/2010	100%
• 2 nd Steering Group meeting	22/04/2010	100%
• 2 nd Monitoring Report of Steering group	29/04/2010	100%
• Project meeting	09/06/2010	100%
• Quarterly meeting	27/08/2010	100%
• 18 month progress report	30/06/2010	100%
• 3 rd Management Board meeting	16/09/2010	100%
• Quarterly meeting	07/10/2010	0%
• 3 rd Steering Group meeting	13/10/2010	0%
• 3 rd Monitoring Report of Steering group	29/10/2010	0%
• Project meeting	31/10/2010	0%
• Quarterly meeting	31/12/2010	0%
• Second year progress report	31/12/2010	0%
• Carbon footprint report (first contributions)	31/12/2010	0%
• Midterm end-user/stakeholder consultation workshop	15/01/2011	0%
• Report on end-user/stakeholder consultation workshop	31/01/2011	0%
• 4 th Management Board Meeting	15/03/2011	0%
• 4 th Steering Group meeting	15/04/2011	0%
• 4 th Monitoring Report of Steering group	28/04/2011	0%
• 5 th Management Board Meeting	15/09/2011	0%
• 5 th Steering Group meeting	15/10/2011	0%
• 5 th Monitoring Report of Steering group	28/10/2011	0%
• 36 month progress report	30/06/2011	0%
• Third year progress report	31/12/2011	0%
Action 2: Satellite data processing by FMI		

Activity	Due date	Completion (%)
<ul style="list-style-type: none"> Contribution to the 1st EO- data document (years 2001-2008) 	30/11/2009	100%
<ul style="list-style-type: none"> The SWE product (see 5.1.2) will be available for all test sites and covering 30 years, 	31/12/2010	90%
<ul style="list-style-type: none"> The SWE product will be validated (in scientific publication), 	31/03/2010	100%
<ul style="list-style-type: none"> The onset of snow melt and snow clearance product will be available for all test sites covering 30 years, 	30/09/2009, 30/09/2010	50%
<ul style="list-style-type: none"> The snow melt / clearance product will be validated in scientific publications, 	30/09/2010	100%
<ul style="list-style-type: none"> Contribution to the 2nd EO- data document (years 2009-2010) 	30/11/2010	0%
<ul style="list-style-type: none"> The soil freezing product will be available for all test sites covering 10 years. 	31/12/2010	75%
<ul style="list-style-type: none"> All (2001-2010) EO data processed, seasonal features extracted and data delivered 	31/09/2011	0%
Action 3: Acquisition and extension of GMES-services GSE Polar View and GSE Land		
Activity	Due date	Completion (%)
<ul style="list-style-type: none"> MODIS dataset for 2001-2008 will be completed. <ul style="list-style-type: none"> Data retrieval through ftp (7/8) TOA coverages (5/8) Products (NDVI, SCA) (0/8) 	30/11/2009	100%
<ul style="list-style-type: none"> AVHRR dataset for 2001-2008 will be completed <ul style="list-style-type: none"> Data retrieval through ftp Night time brightness temperatures 	30/11/2009	100%
<ul style="list-style-type: none"> 1st EO- data document (years 2001-2008) 	30/11/2009	100%
<ul style="list-style-type: none"> MODIS dataset for 2009-2010 will be completed <ul style="list-style-type: none"> Data assembled from operative archive TOA coverages Products (NDVI, SCA) 	30/11/2010	30%
<ul style="list-style-type: none"> AVHRR dataset for 2009-2010 will be completed <ul style="list-style-type: none"> Data retrieval through ftp Night time brightness temperatures 	30/11/2010	0%
<ul style="list-style-type: none"> 2nd EO- data document (years 2009-2010) 	30/11/2010	0%
<ul style="list-style-type: none"> All (2001-2010) EO data processed 	31/09/2011	80%
Action 4: In situ data collection and processing by FMI		

Activity	Due date	Completion (%)
1. The initial and boundary data field sources for the models are selected.	28/02/2010	100 %
2. 1 st Data document is completed.	31/12/2009	100%
3. 2 nd Data document (year 2010)	31/12/2010	0%
4. 3 rd Data document (year 2011)	30/11/2011	0%
Action 5: In-situ data collection and processing by SYKE		
Activity	Due date	Completion (%)
• Field measurement campaign in spring 2009	31/05/2009	100%
• Field measurement campaign in autumn 2009	31/10/2009	100%
• 1 st in-situ data document (Field activities 2009 and data from 2001-2009)	30/11/2009	100%
• Field measurement campaign in spring 2010	31/05/2010	100%
• Field measurement campaign in autumn 2010	31/10/2010	0%
• 2 nd in-situ data document (Field activities and data from 2010)	30/11/2010	0%
5. 3 rd Data document (year 2011)	30/11/2011	0%
Action 6: Methodology development and implementation by FMI		
Activity	Due date	Completion (%)
• REMO2008 model taking into account the tracer transport, will be running reliably on at least one of the computational facilities available for FMI personnel.	31/12/2009	100%
• The set of variables which are necessary to transfer in between REMO and JSBACH models will be decided and derived.	28/02/2010	100%
• First trials on running the coupled REMO-.JSBACH model will be made.	31/05/2010	100%
• 1 st Progress report on methodology	31/05/2010	100%
• The sequence of REMO-JSBACH model runs including the required data flows between the models will be initialized.	31/07/2010	100%
• First trials by using the land cover data (from the action 11) will be made	31/10/2010	0%

<ul style="list-style-type: none"> Data utilization from the Actions 3, 4, 5 and 11 will be reviewed according to the status of the models and the results of the initial runs. 	31/12/2010	0%
<ul style="list-style-type: none"> All (2001-2010) EO data processed, seasonal features extracted and data delivered 	31/09/2011	0%
<ul style="list-style-type: none"> 2nd Progress report on methodology 	31/08/2011	0%
Action 7: Methodology development and implementation by SYKE		
Activity	Due date	Completion (%)
<ul style="list-style-type: none"> The unfiltered time-series, in the gridded form, of snow covered area (SCA) and normalized difference vegetation index (NDVI), years 2001-2008 	30/11/2009	100%
<ul style="list-style-type: none"> Filtered time-series with preliminary techniques and progress report on filtered time-series (years 2001-2008) 	31/05/2010	100%
<ul style="list-style-type: none"> Features extracted (years 2001-2008) 	31/08/2010	100%
<ul style="list-style-type: none"> Progress report on extracted features (2001-2008) 	31/08/2010	100%
<ul style="list-style-type: none"> Filtered time-series with sophisticated techniques and progress report on filtered time-series (years 2001-2008) 	30/11/2010	20%
<ul style="list-style-type: none"> Time series of years 2009-2010 	31/03/2011	0%
<ul style="list-style-type: none"> Features extracted (years 2001-2010), final phase progress report 	31/09/2011	0%
<ul style="list-style-type: none"> Time series for 2001 -2010 processed, seasonal features extracted and data delivered 	31/09/2011	0%
Action 8: Demonstration and validation by FMI		
Activity	Due date	Completion (%)
<ul style="list-style-type: none"> System functionality validation at Sodankylä-Pallas CAL-VAL site 	01/09/2010	10%
<ul style="list-style-type: none"> System validation over Finland with different resolutions on selected test years 	01/09/2010	10%
<ul style="list-style-type: none"> System validation over Baltic test area for selected years 	01/09/2010	10%
<ul style="list-style-type: none"> Selection of system setup and parametrization from validation results 	01/10/2010	0%
<ul style="list-style-type: none"> Estimation of carbon balance for Baltic EU area with selected setup 	30/11/2010	0%

• Production of preliminary demonstration report	30/11/2010	0%
• Preliminary demonstration report by FMI	31/12/2010	0%
• Demonstration report	31/12/2011	0%
Action 9: Demonstration and validation of EO services		
Activity	Due date	Completion (%)
• Implementation of the data exchange method completed	30/11/2009	100%
• Documentation of the data exchange method produced.	30/11/2009	100%
• Preliminary demonstration report	30/11/2010	10%
• Demonstration report	31/12/2011	0%
Action 10: Generation of carbon assessment end-products		
• No activity until 2012		
Action 11: Evaluation of required Northern-Eurasian land cover information		
Activity	Due date	Completion (%)
• Analysis on land cover data needs for carbon balance mapping	31/08/2009	100%
• Report on land cover data needs	31/08/2009	100%
• Production of land cover dataset	01/06/2010	100%
• Report on data production and accuracy	31/10/2010	40%
• Report on suitability of global land cover datasets for carbon balance modeling quarter of 2010	31/10/2010	30%
• Evaluation of continental and regional land cover data completed	30/06/2011	0%
Action 12: Dissemination		
Activity	Due date	Completion (%)
• Project website	01/01/2009	100%
• 1 st project brochure	30/03/2009	100%
• Update of the project website layout	31/12/2009	100%
• FTP server for data exchange (performed in Action 9)	30/11/2009	100%

<ul style="list-style-type: none"> • Presentations in relevant scientific conferences and seminars. <ul style="list-style-type: none"> ◦ <i>SPIE Europe Remote Sensing 2009</i>: 31 August - 3 September 2009 Berliner Congress Centre, Berlin, Germany (poster, presentation) 	31/08/2009	100%
<ul style="list-style-type: none"> • Project poster describing SnowCarbo project, background and objectives. 	31/12/2009	100%
<ul style="list-style-type: none"> • Preparation of an online newsletter presenting first project results. 	16/04/2010	100%
<ul style="list-style-type: none"> • Preparation of the 2nd online newsletter presenting first project results. 	31/12/2010	0%
<ul style="list-style-type: none"> • 1st project brochure (updated) 	30/06/2011	0%
<ul style="list-style-type: none"> • Layman's article in Finnish in Helsingin Sanomat (one of the main Finnish newspapers with a weekly Science section). 	31/12/2011	10%
<ul style="list-style-type: none"> • 1st project brochure (final) 	31/12/2012	0%
Action 13: Auditing		
<ul style="list-style-type: none"> • No activity until end of 2012 		
Action 14: Project advisory co-operation		
Activity	Due date	Completion (%)
<ul style="list-style-type: none"> • Participation to the 1st Management Board meeting 	14/10/2009	Not possible
<ul style="list-style-type: none"> • Telecon to the Project meeting 	28/10/2009	Not possible
<ul style="list-style-type: none"> • Contribution to the 1st Monitoring Report of Steering group 	31/10/2009	100%
<ul style="list-style-type: none"> • Inputs for the 1st Steering Group meeting 	31/10/2009	100%
<ul style="list-style-type: none"> • Climate Scientist will be hired by December 2009. 	01/12/2009	100%
<ul style="list-style-type: none"> • Telecon to the Quarterly meeting 	18/12/2009	100%
<ul style="list-style-type: none"> • Contribution to the First-year progress report 	31/12/2009	100%
<ul style="list-style-type: none"> • Participation to the 2nd Management Board meeting 	10/03/2010	100%
<ul style="list-style-type: none"> • Telecon to the Quarterly meeting 	08/04/2010	100%
<ul style="list-style-type: none"> • Inputs for the 2nd Steering Group meeting 	15/04/2010	100%

• Telecon to the Project meeting	09/06/2010	100%
• Telecon to the Quarterly meeting	27/08/2010	100%
• Contribution to the 18 month progress report	30/06/2010	100%
• Contribution to the 3 rd Monitoring Report of Steering group	06/10/2010	100%
• Participation to the 3 rd Management Board meeting	16/09/2010	Not possible
• Telecon to the Quarterly meeting	07/10/2010	Not possible
• Inputs for the 3 rd Steering Group meeting	15/10/2010	0%
• Telecon to the Project meeting	31/10/2010	0%
• Telecon to the Quarterly meeting	31/12/2010	0%
• Contribution to the Second year progress report	31/12/2010	0%
• Contribution to the Carbon footprint report (first contributions)	31/12/2010	0%
• Adaptation and use of the Orchidee land surface model to support the objectives of the SnowCarbo project	31/12/2010	30%
• Advice, comments and inputs for the activities in Action 2	31/12/2010	25%
• Advice, comments and inputs for the activities in Action 3	31/12/2010	25%