

3.2 Progress report

Message info

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Call	Researcher Networks 2009

Project plan

A detailed plan covering collaborative activities during the three years

The core aim of the proposed network is to promote Nordic scientific knowledge to the international forefront on integrated modelling and forecasting of the atmospheric environment, including weather, climate, air quality and their mutual feedbacks. MUSCATEN will be structured according to three main strands of activities:

1. Modelling the atmospheric BL and surface-related processes and parameterisations, with emphasis on NWP applications (leading: Finland, Prof. S. Zilitinkevich).
2. Modelling atmospheric chemical composition and air quality with emphasis on up- and downscaling, and scale interaction in ACT models (leading: Norway, Dr. Michael Gauss).
3. New generation of integrated numerical weather prediction atmospheric chemical transport (NWP-ACT) model systems with two-way feedbacks, including aerosol forcing of solar radiation and cloud formation, and integrating efforts from the activities of strands 1 and 2 (leading: Denmark, Prof. A. Baklanov).

Strand 1:

Special attention will be devoted to long-living stably-stratified BLs, the snow cover and water/land heterogeneities (e.g. lakes and archipelago) common in the Arctic and Nordic latitudes, but not well described so far in current NWP and ACT models. In the surface data assimilation, we will focus on optimal use and combination of different observational sources in order to prepare a balanced initial state for operational atmospheric models. Advanced mathematical methods both for the data assimilation and forecasting systems will be developed and applied within MUSCATEN. The basic framework for Strand 1 developments will be the HARMONIE system including the SURFEX package for handling processes related to atmosphere-surface interactions.

Strand 2:

The network activity in the field of atmospheric composition will concentrate on an integrated consideration of multi-scale chemical and physical processes driving the dispersion and transformation of atmospheric tracers. MUSCATEN will bring together the groups working at city-, meso- and regional scales and benefit from global studies. The questions of particular interest will be the up- and down-scaling of chemical composition studies, multi-scale parameterizations of governing processes and interactions with NWP modelling systems at each specific scale in ACT models. The impact and features of aerosol formation processes in industrial and remote regions, especially from biogenic precursors important in the boreal environment, will be considered in connection with the climate research groups.

Strand 3:

MUSCATEN will develop a new generation of integrated NWP-ACT modelling system framework with two-way feedbacks (i.e. temporal evolution in a given parameter arising from one model is carried to the other model, and the induced changes in the parameter there are brought back to the mother model). The two-way feedbacks will especially focus on the impact from aerosol forcing of solar radiation, cloud processes and further chemical transformation of pollutants. Other aspects to investigate are integrated modelling interfaces and the online/offline problematic to assess the online/offline advantages vs. disadvantages, interfaces conditions and requirements. Specific studies of meteorological and chemical processes interactions and interactions of the ACT and NWP modelling systems at different scales will be considered as well.

The MUSCATEN networking activities will be integrated through targeted workshops and training schools addressing all the core issues:

1. Workshop/training school on modelling of snow/ice-atmospheric interactions Finland, winter 2010.
2. Workshop/training school on modelling of lake-atmospheric interactions Sweden, Summer 2010.
3. Workshop/training school on integrated NWP-ACT modelling Denmark, spring 2011.
4. Workshop on volatile organic compounds (VOC): emissions, aerosol formation, modelling Estonia, 2011.
5. Workshop on chemical composition modelling in Northern Europe Sweden or Lithuania, 2011/12.
6. Workshop/Training school on surface-related modelling and data assimilation (SURFEX) France, spring 2012.

MUSCATEN aims to cover the basic research and researcher training towards the application of these models. We plan several mutual research visits relatively to the research strands, with priority given for students. Local university courses on NWP and ACT, such as the NUMLAB course of UH, MISU HIRLAM course, the DMI Enviro-HIRLAM course and the courses of dynamical meteorology and numerical modelling of RSHU are open for participants from MUSCATEN. Such participation will be supported, in order to enrol research-oriented last-year students into multi-scale integrated NWP-ACT modelling research already within their diploma projects.

An active and interactive web page, providing resources and helping to organising the activities, will be created for exchange and dissemination of information within the network as well as to promote the Nordic networking activities.

Progress report

Two workshops were carried out, as planned:

1. MUSCATEN-NETICE workshop on Modelling of snow-ice-atmosphere interactions, March 24-26 in Kuopio, Finland: 27 participants from 7 countries (incl. invited speakers from France and Russia), 21 oral presentations. The workshop was carried out in cooperation with Nordic network NetIce. More information: <http://muscaten.ut.ee/SNOW10> .
2. Second Workshop on Parameterization of Lakes in Numerical Weather Prediction and Climate Modelling in Norrköping, Sweden, September 15-17: 33 participants from 11 countries (incl. an invited speaker from UK), 25 oral presentations. More information: <http://muscaten.ut.ee/LAKE/> .

To compensate the lack of special training programme for students in these workshops, MUSCATEN participated in EnviroHIRLAM research training week held at June 7-12 in Copenhagen, Denmark (travel support for Adomas Mazeikis, LMHI, Lithuania). See also: <http://muscaten.ut.ee/EnvHirlam/> .

The other activities aside workshops and a training course, were:

1. Cooperation of University of Tartu with Finnish meteorological Institute on developing the air quality modelling system SILAM, including high-resolution (urban-to-regional scale) application in EMHI: two visits by senior researcher Marko Kaasik and students Riinu Ots and Ardi loot from UT to FMI.
2. Cooperation of LMHI with Danish Meteorological Institute on EnviroHIRLAM online coupled weather forecast, - air quality modelling system, including two-way feedbacks: two visits by Adomas Mazeikis from LMHI to DMI.
3. Cooperation between FMI and SMHI on meteorological plus air quality modelling (HIRLAM and MATCH models) and implementation of SALSA model of aerosol dynamics into air quality modelling. A visit by Harri Kokkola (FMI) to SMHI and a visit by Stefan Gollvik (SMHI) to FMI took place.

In total 9 visits (25 person-days) took place.

The activity of participants on mutual research cooperation visits was lower than expected. To activate the cooperation between partners, a few smaller problem-focused work meetings are planned for 2011. Also, a 10-days training course on Integrated Modelling of Meteorological and Chemical Transport Processes /

Impact of Chemical Weather on Numerical Weather Prediction and Climate Modelling is organised in Odessa, Ukraine, see <http://muscaten.ut.ee/YSSS/1info.html> .

Financial report

Budget report

	Budget	Actual	Deviation
Expenses			
Travel expenses	110,000	56,458	53,542
Living expenses	150,000	107,162	42,838
Honoraria	0	0	0
Administration (max 10 % of the grant)	30,000	8,343	21,657
Material	10,000	0	10,000
Other	0	0	0
Section totals	300,000	171,963	128,037
Period totals	300,000	171,963	128,037
Year	Paid	Used	
2009	300,000		14,265
2010	300,000		171,963

Comments or deviations

In 2010 were carried out two workshops, as planned in the project proposal:

1. MUSCATEN-NETICE workshop on Modelling of snow-ice-atmosphere interactions, March 24-26 in Kuopio, Finland.
2. Secondnd Workshop on Parameterization of Lakes in Numerical Weather Prediction and Climate Modelling in Norrköping, Sweden, September 15-17.

Total cost of workshops was 144381 NOK.

10 research cooperation and training visits, not related with the workshops took place, total cost 27582 NOK.

The main reason of underspending was lower than expected activity of participants by means of research cooperation visits. Also, the decreasing prices of flight tickets affected the proportion of travel expenses in total budget. In current year, 2011 there are planned two rather big events: Summer School on

Integrated Modelling of Meteorological and Chemical Transport Processes /Impact of Chemical Weather on Numerical Weather Prediction and Climate Modelling in Odessa, Ukraine (Nordic/Baltic students expected) and a workshop on biogenic volatile organic hydrocarbons in Estonia. Also, to stimulate the cooperation, some smaller work meetings are arranged, e.g. surface data assimilation working days were in Helsinki.

In total 17952 NOK was spent by institutions of Baltic countries (UT and LMHI, also by FMI for accommodation of Baltic guests) for co-funding of visits by Baltic participants. That constitutes 32% of total expenses made in Baltic countries.

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I hereby confirm that the information given is based on accounts, and that the project has been audited in connection with the institution's regular audit.

Yes

Participants

	Research students		Other participants		Country total		
	M	F	M	F	Male	Female	Total
Denmark	5	2	5	0	10	2	12
Finland	4	6	7	3	11	9	20
Iceland	0	0	0	0	0	0	0
Norway	1	1	6	1	7	2	9
Sweden	2	2	6	3	8	5	13
Estonia	3	5	6	0	9	5	14
Latvia	2	2	3	0	5	2	7
Lithuania	1	1	2	2	3	3	6
Russian Federation	4	4	5	2	9	6	15
France	1	1	5	0	6	1	7
Total	23	24	45	11	68	35	103

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Denmark	5	2	5	0	10	2	12
Finland	4	6	7	3	11	9	20
Iceland	0	0	1	0	1	0	1
Norway	1	1	6	1	7	2	9
Sweden	2	2	6	3	8	5	13
Estonia	3	5	6	0	9	5	14
Latvia	2	2	3	0	5	2	7
Lithuania	1	1	2	2	3	3	6
Russian Federation	4	4	5	2	9	6	15
France	1	1	5	0	6	1	7
Ukraine	0	0	1	0	1	0	1
Total	23	24	47	11	70	35	105

Comments or deviations

Iceland (the Horfour Company) and Ukraine (Odessa State Environmental University) have joined with the network in end of 2009.