

STATUS OF SOLAS ACTIVITIES IN DENMARK

(submitted by Lise Lotte Sørensen and Søren E. Larsen, Nov 2002)

Current status of SOLAS planning

A EU project (MEAD) with a joint Danish effort addressing SOLAS goals has taken place from 2000 to 2003. The overall objective of this project is to describe the effects of atmospheric nitrogen deposition on coastal water biogeochemistry. The Danish effort in this project and in other related national and international projects is addressing following specific objectives:

Develop a high-resolution atmospheric model that realistically represents the complex meteorology and atmospheric nitrogen chemistry of the coastal atmospheric boundary layer.

Atmospheric measurements of chemical compounds and micrometeorological parameters to improve understanding and help parameterisation of the air-sea exchange processes in atmospheric models (i.e. modelling of boundary layer height, modelling of air-sea exchange of reactive gaseous compounds).

Develop a coupled hydrodynamic biogeochemical model of the Kattegat that can be used to assess the impact of atmospheric deposition events.

Biogeochemical measurements in coastal waters to parameterise the water column model.

Retrospective analysis of existing atmospheric deposition, phytoplankton abundance and satellite imagery data to investigate any links between atmospheric nitrogen deposition and bloom development.

Coupling of water column and atmospheric models to yield a tool to investigate scenarios of the effects of changes in atmospheric nitrogen emissions on eutrophication problems.

Participants are:

Risoe National Laboratory, Department of Wind Energy, contact: Dr. Lise Lotte Sørensen (lotte.geern@risoe.dk)

National Environmental Research Institute, Department of Marine Ecology and Department of Atmospheric Environment, contact: Dr. Trine Christiansen (trc@dmu.dk)

Future plans for national activities

The possibility to obtain national funding from the Danish Scientific Research Council will be explored and a meeting to plan future national efforts in the Danish SOLAS community will be arranged.

A study on air-sea exchange of especially aerosols will be carried out within the framework of the Nordic Centre of Excellence. The project will aim on improving current understanding of the exchange processes through measurements in order to improve parameterisation of the aerosol fluxes in atmospheric models.

Opportunities for national participation in international SOLAS activities

Denmark has considerable expertise in SOLAS-type science, such as in the cycling of biogenic gases between and in ocean and atmosphere (e.g. ammonia, nitrogen oxides, CO₂), aerosol physics and chemistry, the physics of air-sea exchange, carbon cycling and atmospheric chemistry, modelling of atmospheric chemical and physical processes in the marine boundary layer including the development of the boundary layer height and atmospheric transport modelling. Furthermore an expertise in retrieving offshore wind speed, wind direction, surface temperature and chlorophyll from satellite observations exists. The accuracy on wind speed and wind direction retrieved from radar observations from the ERS-2 SAR (European Resource Satellite, Synthetic Aperture Radar) has been investigated for a site in the North Sea and compared successfully to meteorological observations 14 km offshore. The spatial resolution of the wind speed maps is 400 m by 400 m, a spatial scale especially relevant in the coastal zone. Furthermore, newly developed techniques for measurements of air-sea fluxes of gaseous nitrogen compounds (REA-systems) and CO₂ exchange (dissipation technique) exist.

Denmark are participating in new project initiatives in corporation with other European partners (e.g. Institute of Atmospheric Science and Climate, Section of Rome, Italy; University of Stockholm, Department of Meteorology, Sweden; Uppsala University, Department of Earth Sciences, Meteorology, Sweden and others), to obtain funding for SOLAS-relevant projects within the EU sixth framework programme.

National contact person and address of the national website if available

Contact: Dr. Søren E. Larsen (Soeren.Larsen@risoe.dk), Risoe National Laboratory, Department of Wind Energy, DK-4000 Roskilde, Denmark.