

Increasingly Understanding Climate Change

In an office a little to the north of Copenhagen, Denmark, a Danish senior scientist is in charge of a four year I3 project, INCREASE, which includes 8 partners from 5 different countries and combines knowledge pools created in 6 large - scale field site infrastructures. INCREASE provides research communities of the European Research Area with unique opportunities to develop excellent research on climate change effects on terrestrial shrublands. The project has recently been selected for EU funding via the Research Infrastructures theme under the Seventh Framework Programme.

Networks that work

Partners in the INCREASE project have bases throughout Europe. Representing organisations in Hungary, Italy, Wales, the Netherlands and Denmark almost all partners knew each other very well from collaboration in previous projects. Inger Kappel Schmidt recalls how the process of putting together the final proposal was nonetheless carried out during a hectic last month leading up to the 5 o'clock Brussels deadline. The proposal drafting process was made easier to handle for the coordinator by the grant of a Danish support initiative, START, which co-finances key activity expenses in the initial phases of the proposal writing process for international sources of financing. This process was further buttressed by a thorough study of the call text and the specific guidelines for applicants – according to Kappel Schmidt an essential effort towards understanding the formal requirements and the underlying ideas of the FP7-Research Infrastructures programme. The campus EU-office, a support unit at the University of Copenhagen, was very helpful for the coordinator in the later stage of the writing process, and especially in connection with more technical aspects, e.g. the organisation of Transnational Access for external users, the FP7-National Contact Point at the Danish Agency for Science, Technology and Innovation was an encouraging and recommendable source of support.

INCREASE is an integrated infrastructure initiative, also called "I3" in *Brussels Speak* and as such it combines networking activities, trans-national access/service activities and joint research activities. The project is thus organised as a network of six research infrastructures consisting of large scale field experiments for studies of climate effects on shrubland ecosystems in Europe. The participating infrastructures offer unique facilities for European scientists to study longer term effects of climate change on shrubland ecosystems. The project improves the state-of-the-art of a "non-intrusive technology" for climate manipulations and non-destructive sampling methodologies and paves the way for further analysis and synthesis of long data records obtained from the same infrastructures during two previously EU-funded projects: CLIMOOR (1998-2000) and VULCAN (2000-2004). Both of these projects had participation by the same core base of partners taking part in INCREASE. The idea of incorporating the six infrastructures into an Integrated Infrastructure Initiative was introduced in order to provide a wider and more efficient access to these unique infrastructures.

Gentle and Effective

The technology used in INCREASE is the recently developed and tested so-called non-intrusive approach. Global warming is caused by a reduction in the loss of long wave IR-radiation from the earth back into the atmosphere

because of the green house gas accumulation in the atmosphere. So far, the temperature increase observed has been caused by increased minimum temperatures at night rather than a general temperature increase.

Inger Kappel Schmidt, the Danish Coordinator of the project explains: "The new method mimics the global warming by covering the ecosystem at night by IR-reflective material – i.e. passive night time warming. Night-time warming mimics global change and has been applied recently to shrubland ecosystems



Picture: The Mols Infrastructure, Denmark

throughout Europe with an effect of warming the soil and plants by up to 2°C. Automated transparent covers activated by rainfall sensors are used to extend drought periods during the summer. These climatic manipulations create realistic changes in climatic conditions similar to the predictions of change in climate models".

The non-intrusive character of the experimental design and the extended use of non-destructive sampling methods within the infrastructures have prevented the infrastructures from being destroyed. Beside the long term stability and the realistic manipulations of climate made possible by the new methodology, the locations of the infrastructures along natural gradients in temperature and precipitation in Europe provide an extra dimension, from the cold heath vegetation in Denmark to the warmer garigue in Italy and from the dry land of Hungary to the wetlands of Wales.

Securing and improving state-of-the-art climate research

Project Coordinator Inger Kappel Schmidt is excited about the potential of the project: "The project creates an excellent framework for internal as well as external users of these infrastructures. Facilities of high standard, an exciting research environment and access to background data and synthesis offer scientists from many different disciplines unique opportunities to develop state-of-the-art Climate Research Activities". In particular, young researchers - but also researchers from new member states where similar infrastructures are sparse - are expected to benefit from the infrastructures and the supervision in the project. Examples of the focus of potential research user teams are the activity of soil enzymes and the physiology of plants.

Having the project selected for EU-funding is a success story in and of itself, but the real work has only just begun. Improving the accumulated understanding of climate changes and its consequences is the serious challenge. The challenge has been accepted.

The project will begin 1 March 2009. The project has not yet a web site but for additional and background information, visit: www.vulcanproject.com or the web site of project coordinator Inger Kappel Schmidt at: <http://en.sl.life.ku.dk/omskovoglandskab/medarbejdere/iks.aspx?>

By Hans Henrik Lomholt, Danish Agency for Science, Technology and Innovation, 2008