Master classes I (2:00–2:30 PM)

The Climate Caravan
Ole Laursen – Denmark
The Danish Society for Nature Conservation
250.000 pupils in secondary schools in Denmark have used educational material from or met The Climate Caravan. A bus has been touring through Denmark in order to raise awareness about climate change and its consequences. There will be a presentation of the project and examples of using dilemmas, conflicts of interest and local debate meetings as part of the education.
Location: SP112

VirtualGalathea3: Education Based on Galathea 3 Science!
Charlotte Bay Hasager – Denmark
Risø National Laboratory for Sustainable Energy, Technical University of Denmark
Charlotte Hassager
VirtuelGalathea3: Education based on Galathea 3 science!

Galathea 3 was a worldwide ship expedition hosting 50 science teams during a period of 10 months from August 2006 to April 2007. Educational material based on the science on-board and on land-sites is formulated and presented in VirtuelGalathea3 www.virtuelgalathea3.dk <http://www.virtuelgalathea3.dk/> The general path for science-based education is through peer-reviewed journals, then in popular form and finally to educational material, a process often taking months to years. In contrast, Galathea3 aimed to provide educational material much faster having teachers on-board and several journalists. VirtuelGalathea3 education is formulated in close collaboration between skilled teachers and the scientists while the scientists were at the same time analysing results. It gives certain challenges, yet the advantage is that the brand new educational material is state-of-the-art in regard to the specific science topics, several on climate change issues. The presentation will describe the working process and well as present selected results from the expedition focussing on climate. The web-based educational material contains large amounts of daily updated satellite images on sea surface temperature, clouds, winds among several other topics, thus Earth Observation data are fully

integrated to the educational material. The work is supported by Egmont Fonden and UVM Tips og Lottopuljen in Denmark.
Location: SP113

Open Content and Collaboratories for Engaging in Real-World Science Learning
Amee Evans Godwin – USA
ISKME – Institute for the Study of Knowledge Management in Education
Rooted in a participatory framework for science pedagogy, collaboratories are flexible platforms for shared experimentation and engagement with open educational resources and scientific data. This session highlights examples of collaboratories where educators work together on issues related to climate change and biology, and model scientific investigation with their students. The examples include models and resources developed in BioQUEST's SCOPE project and OER Commons International Teacher Exchange Pollen project.
Location: SP114

From footprints to handprints – A South African example of education for positive climate action
Anisa Khan – South Africa
Treasure Beach Environmental Education Centre
The “Ecological footprint” is by no means a new concept but it has functioned as a useful tool to “measure” the impact made by individuals, businesses, cities etc. on the natural resource base upon which we depend. This spreading footprint has had a marked impact on our ecosystems and has caused major biodiversity losses. The Centre for Environment Education (CEE), in Ahmedabad, India has started an International initiative to highlight a new concept of the “handprint” rather than the footprint as a tool for action on reducing this impact we have collectively made on our ecosystems. The purpose of the handprint is to help measure positive action for change and brings a shift in pedagogy away from destructive behaviours to more positive actions that bring about positive change.
The CEE, in partnership with Share-Net (WESSA) and other partners have developed an adaptive resource pack called “The Handprint Series”. Each of these booklets have been compiled by community members who have focused on authentic local and current stories as a means of tackling environmental issues through education, for example titles such as “Did you grow your Greens?” begin with a start up story written

from the perspective of a young boy visiting his local market. This story and comprehension questions begins the dialogue on the merits of growing your own food and is followed by “trying out” and “finding out” activities as well as information on how to start growing plants from cuttings.
The handprint series has been developed as an adaptive resource, that is, it has been designed as a framework to develop ones own stories and to put these together to form locally relevant and useful materials for use in curriculum linked environmental education. It is proposed that a workshop be conducted that provides attendees with an overview of how to use this framework to find and write their own stories on local climate change related issues.
The workshop will provide a background to the emergence of the handprint concept, an overview of the books that are currently available, will provide pdf and word formatted hadbooks and will go through the process of how to begin writing ones own story.
Location: SP207

Master classes II (2:30-3:00 PM)

Green Flag – Green School
Lone Skafte Jespersen og Helle Houkjær – Denmark
Krogaardskolen (primary and lower secondary school). Winners of the Danish Championship in Science Teaching 2008
Based on our eco-school project Green Flag we provide concrete ideas for environmental teaching. This involves heat-sensitive cameras as a means to give students the practical options when it comes to CO2 savings. You will have the opportunity to test the heat-sensitive cameras at the workshop. Two years ago we had a very wet summer in Denmark and some areas experienced heavy flooding. We saw this sad situation as an opportunity to motivate pupils to learn more about the climate changes that we are experiencing. At the workshop we will present the work we have been doing in the classroom.
Location: SP208

Glaciers and rain forests. A study from Space performed in the classroom
Peter Brøgger Sørensen – Denmark
European Space Agency, Eduspace
Earth Observation, EO, is an important tool to monitor Global Changes. The European Space Agency, ESA, is offering the web-based material, Eduspace, to secondary schools. Eduspace gives background material, EO data in the form of satellite images and an educational software package LEOWorks to visualize and

analysed the satellite images. The goal of Eduspace is to put the student in the centre of the learning process. Eduspace is available in the following languages: English, German, French, Spanish, Italian, Danish, Dutch and Portuguese.
The master class will show how the students themselves through a study of a time series of satellite images can analyze the process of deforestation. It will start with a PowerPoint presentation succeeded by hands on using the Eduspace image processing software LEOWorks.
PowerPoint:

- Introduction to Earth Observation
- Glaciers – the Canaries of Climate Change
- The deforestation of the tropical rain forest
- Presentation of work sheet

Hands on work using LEOWorks

- Inspection of a time series of the rain forest in Rondonia, Brazil from 1973 to 2000.
- Construction of a false colour image showing the extent of the deforested areas in 1986 and 2000.
- Conducting a supervised classification of the area for 1986 and 2000.
- Measure the increase of the arable land.
- Discussion of the consequences of the findings for the local area and for the global warming.
- Perspective questions for the students to investigate further

Location: SP212

GoNorth!: Beyond classroom walls – teaching climate change from a dogsledge in the Arctic

Mille Porsild – USA
University of Minnesota, Adventure Learning for the K-12 Classroom

Join Kindergarten through 12th grade classrooms in more than 4500 schools throughout 30 countries on six continents with the free GoNorth! adventure learning series developed at the University of Minnesota. Every year we go live for 14 weeks dog sledding through an Arctic locale (next is Greenland!). Anchored in a 500+ page natural and social science curriculum reflecting the locale, students collaborate online with each other, Arctic peoples and topic experts to investigate issues and solutions of climate change in the context of sustainable development.

Location: SP214

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Projects on Energy Conservation and Climate Change: The fifty/fifty-Project in Berlin and Further Development to Political Involvement, Environmental Justice and Community Action

Malte Schmidthals – Germany

UfU- Independent Institute for Environmental Concerns
This project fosters intelligent user behaviour by means of financial incentives for the school and it provides practical support for teachers. The achievements and outcomes of this project in different types of school are shown and combined with new approaches and issues in environmental education such as environmental justice and leaving school for "real-world-projects". The project meets the goals of climate change, environmental justice and political involvement, it helps widen energy conservation projects in schools and it is an opportunity for students to mature, learn life skills and responsibility.
Location: SP112

Focusing on teaching climate education
Maebeebe Mokeleche – Lesotho
Lesotho College of Education & University of the Witwatersrand, Wits School of Education, South Africa
The introduction of the notion of teachers' knowledge base for teaching has triggered a new wave of research, slightly shifting the focus away from learners to the teachers focusing on their best practices. In accordance to Shulman' s construct of teachers' pedagogical content knowledge (PCK), which entails an amalgamation of content and pedagogy in order to develop best teaching practices, Loughran developed a model for capturing and portraying teachers' PCK; the model of content representation (CoRe). This model has a good potential for helping teachers to give any topic a thought it deserves before teaching. It enables the teacher to reflect on issues such as learners and their understanding, identification of points of confusion, effective sequencing and framing of ideas. In this session we will discuss Loughran's model with regard to climate education and develop short teaching plans that we can take away to our schools and use for teaching.

Location: SP113

Master classes III (3:30-4:00 PM)

Innovation and climate: Designing a Greenhouse for Greenland
Peter Eduard – Denmark
Faaborg Gymnasium (upper secondary school). Winner of the Danish Championship in Science Teaching 2007

A science class from the Danish high-school/upper secondary school of Faaborg, in collaboration with the University of Aarhus, has been working on the development of new types of greenhouses, which can rise to the challenges and opportunities that global warming presents. The class plans to deploy full-scale prototypes of greenhouses that excel within the areas of energy consumption, as well as having the ruggedness required for deployment in areas evacuated by permafrost and ice. One such spot is on the island of Disco, situated just West of Greenland. The audience will be invited to have a dialogue about the relevance and potential in including topics such as climate changes in high-school curriculum and experience hands-on science, when it comes to building scale models and prototypes.

Location: SP114

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To St. Petersburg school pupils about climate change

Natalia Koryakina – Russia
Head of children´s environmental centre in State Unitary Enterprise Vodokanal St. Petersburg

Master class abstract to be announced.

Location: SP207

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Climate Change: A Local and Global Inquiry – a collaborative Climate Change project between students at 7 schools in Tasmania, Japan and Thailand.

Craig Kerr – Australia
Assistant Principal, Tasmanian Academy.

Craig Kerr is a science teacher and Assistant Principal at a government Year 11/12 school in Devonport, Tasmania, Australia. He has 25 years teaching experience in primary, secondary and senior secondary schools, and holds a degree in engineering and masters and doctoral degrees in education. His research interests include the study of science learning environments and he has been the recipient of several federal government grants in Australia to manage innovative Primary-Tertiary science learning programs.

This presentation profiles a collaborative student-driven project connecting primary, secondary, senior secondary and tertiary students to local and global effects of Climate Change. Students in Tasmania, Thailand and Japan used a combination of methodologies to investigate effects of Climate Change, and to develop shared understandings and inform their communities. Methodologies included scientific studies, field trips, guest speakers and collaborative projects. Examples of the scientific investigations were profiling of local beaches, sea level rise, sea acidity and temperature changes, ice sheet movement, and Antarctic weather. A learning management system and school intranets supported the sharing of data, and all students and staff were connected via a structure of Climate Change Clubs in each of the seven schools. Project students were mentored by students and scientists from the University of Tasmania and partner scientific bodies such as Australian Antarctic Division, CSIRO and Bureau of Meteorology, as well as community members.

Highlights of the project were the inclusive nature of understandings developed between students of all ages and abilities and the empowerment of individuals to further empower and influence others.

Location: SP208

INSPIRE – School Education by Non-formal Learning in the
Field of Renewable Energies and Climate Change

Veronika Schulte – Germany
Hamburg University of Applied Sciences, Faculty of Life Sciences

The EU-project »Inspire School Education by Non-formal Learning« (INSPIRE) fosters information and learning on renewable energy and climate change. The vision of the project INSPIRE is to improve the quality and attractiveness of in-service teacher training in an extracurricular context and by using new learning places. The project INSPIRE is funded by the European Commission´s Lifelong Learning Programme (2007) by means of the COMENIUS Multilateral Project's budget line. The main objective of the project INSPIRE is to create synergies and links between out-of-school places of learning and curricular learning, thus improving the base of knowledge of European pupils on matters related to education for sustainable development. In addition, it aims to prepare a set of materials which may support teacher training on renewable energy and climate issues, as well as test such materials with a view to their subsequent use in support of informal education. The main target groups of INSPIRE are teacher training institutes and non-formal education institutions such as museums, environment centres, etc. It is expected that school teachers and education officers working in non-formal education outlets will access the new pedagogical methods developed as part of the project and use the practical information on teaching approaches developed in this context, which may optimise non-formal learning processes. This paper introduces the project INSPIRE, its partnership, activities and especially its results.

Location: SP212