

CCES News 1

Climate and environmental change are important topics dealt with in the Competence Center Environment and Sustainability of the ETH Domain (CCES, www.cces.ethz.ch). 'CCES News' is a new publication channel informing on scientific events, education and outreach activities, and on research highlights of CCES projects and partners.

Scientific Events

Environmental Decisions: Risks and Uncertainties

International Conference on Monte Verità, Ascona, April 25 to 29, 2010

This conference aimed at stimulating an in-depth cooperation of scholars from the fields of risk perception, risk assessment, risk management and risk governance. The overall aim was to improve decisions and the decision making processes related to environmental risks such as climate change, resource depletion, water problems etc. Among the key results of this conference was the insight that according to the type of environmental problem, the type of actors involved, the type of risk communication and the relevant time frame changing values, economic incentives or regulatory approaches would lead to convincing solutions for environmental problems under risk and uncertainty. The more collaboration between different disciplines and between different risk fields we have, the better the chances are to develop technically, economically and ethically sound solutions for solving environmental problems.

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The conference was organized as part of the CLIMPOL project by the Institute for Environmental Decisions (ETH Zurich) and Social Psychology Group (University of Zurich):
www.ied.ethz.ch/CEDRU

Triggering of Rapid Mass Movements in Steep Terrains: Mechanisms and Risks

International Conference on Monte Verità, Ascona, April 11 to 15, 2010

The goal of the conference was to assemble experts working on different types of mass movements and hillslope processes to identify unifying concepts and underlying processes for these natural hazards in mountainous regions. The workshop benefited from uniform high quality presentations including many presented by young



Joint excursion of conference participants and practitioners to rockfall – debris flow area Preonzo. Photo: M. Stähli, WSL.

scientists, and we were particularly impressed by the dialogue to identify analogies among different types of mass release events. An additional value of the conference was the organization of a 'practitioner's day' with experts on natural hazards in Switzerland joining the workshop to discuss findings of ongoing research.

Dani Or, Peter Lehmann, Soil and Terrestrial Environmental Physics, ETH Zurich; Manfred Stähli, Mountain Hydrology and Torrents, Swiss Federal Research Institute, WSL
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The conference was organized by the TRAMM project:
www.cces.ethz.ch/projects/hazri/tramm/conference

Outreach

Climate policy after the Copenhagen Conference: American and European Views

A Panel discussion with Congressman Jim Sensenbrenner and ETH climate experts

Decision-makers around the globe struggle with reaching a consensus on global climate policy, so as well in Copenhagen at the Climate Conference. At a panel discussion on March 30, 2010, U.S. Congressman Jim Sensenbrenner and ETH climate experts discussed about climate policy and

exchanged American and European views on this topic. The Republican Sensenbrenner believes in anthropogenic climate change but doubts that a multinational agreement is possible, least of all within the U.N. framework. Lucas Bretschger, Professor for Resource Economics, Andreas Fischlin, Professor for Terrestrial Systems Ecology and Ulrike Lohmann, Professor for Atmospheric Physics, challenged Congressmen Sensenbrenner's position especially with regard to the responsibility of the industrialized countries towards developing countries and the following generations.

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The event was organized as part of the CLIMPOL project:
www.cces.ethz.ch/projects/clench/CLIMPOL

Education

PhD Colloquium on Climate Change

Everyone knows that the problem of climate change is a problem which has to be tackled by the natural sciences as well as the social sciences. To foster the dialogue between the two and therefore plenty of different disciplines, the ClimPol PhD Colloquium on Climate Change which takes place every two weeks is open to everyone interested in the topic of climate change. So far, we listened to and discussed more than eighteen presentations in the last three semesters, ranging from the issue of the equilibrium climate sensitivity to the design of the building envelope of a zero-emission building or effects of climate-relevant policy on innovation in the power sector.

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This activity is organized as part of the CLIMPOL project.
Semester program available at:
www.cces.ethz.ch/projects/clench/CLIMPOL/PhD_Colloquium

Research

Evidence of genetic adaptation to different environments in trout

In view of the environmental changes predicted for the next decades, it is important to understand how organisms are genetically adapted to their current habitat to assess how they may respond to novel conditions.

To address this question, we carried out detailed molecular analyses on trouts sampled in diverse

environments from the Swiss midlands to alpine streams in three major European drainage systems (Rhine, Rhone, Po). We found that trout populations in the different drainages have retained some genetic distinctness although there was also clear evidence of gene exchange across drainage boundaries as a result of human management. Some genetic variants were found to be more common in alpine streams than in warmer rivers at lower elevations and vice versa, suggesting that trout may be genetically adapted to particular environments. Our findings show that some adaptive genetic diversity has persisted in Swiss trout populations and should be conserved as an important component of biodiversity.

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The study makes part of the BioChange project: www.cces.ethz.ch/projects/clench/BioChange/schedule/taskforce3

Avoided Deforestation: Prospects for Mitigating Climate Change

Annual CO₂ emissions from deforestation in tropical and sub-tropical countries account for



What contribution could tropical forests make to climate change mitigation? Photo: D. Rustagi, ETH Zurich

about 20 percent of global greenhouse gas emissions. Reducing Emissions from Deforestation and Degradation (REDD) has thus been identified by the international community as an important component of post-2012 climate mitigation policy. Yet many open questions remain on how reducing deforestation could be credibly incorporated into a climate regime. As part of the CLIMPOL project, the volume Avoided Deforestation:

Prospects for Mitigating Climate Change, edited by C. Palmer and S. Engel (www.routledge-economics.com/books/Avoided-Deforestation-isbn9780415447126), investigates possible gains from including REDD in a post-Kyoto agreement, reviews the main challenges, and discusses how these challenges could be tackled. While there is a strong case for including REDD in a global mitigation strategy and progress has been made in addressing previous concerns, current pilot activities have a crucial role in demonstrating feasibility on the ground.

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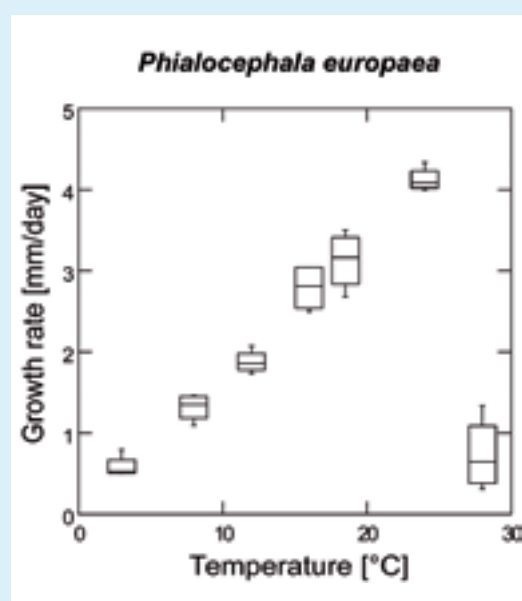
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The book is the outcome of research which is part of the CLIMPOL project: www.cces.ethz.ch/projects/clench/CLIMPOL

Does climate change increase competition among fungal root symbionts?

Temperature is one of the key factors influencing plants and fungi. Sustained change of temperature, as it is expected to occur under a climate change scenario, will alter species distributions, increase the frequency of species replacements and will destabilize antagonistic and mutualistic interactions among species (Pautasso et al 2010). Symbioses between plants and fungal endophytes or mycorrhizal fungi will also be affected. The roots of many coniferous and deciduous tree species, shrubs and herbaceous plants form symbioses with fungal endophytes in addition to classical mycorrhizae. Fungi of the *Phialocephala fortinii* s.l.-*Acephala applanata* species complex (PAC) are ubiquitous fungal endophytes in plant roots in temperate and boreal ecosystems of the Northern hemisphere and are supposed to be key components of these ecosystems (Grünig et al 2008b; Sieber 2002). PAC are morphologically uniform but genetically highly diverse and are composed of several reproductively isolated cryptic species (Grünig et al 2008a; Grünig & Sieber 2005). PAC species occur sympatrically, often adjacent to each other or intermingled in the same root segment. In forest ecosystems, communities of PAC form persistent complex networks. PAC can behave as commensals, mutualists or opportunistic pathogens depending on genetic traits and environment.

Temperature requirements of PAC are not well known. Therefore, growth rates of some of the most abundant PAC species were studied along a temperature gradient ranging from 4 to 36 °C. Growth increased almost linearly from 4 to 18 °C



Box plots showing the variability of growth rates [mmd^{-1}] of *Phialocephala europaea* in the temperature range from 4 °C to 28 °C

and optimum temperature for growth laid between 18 and 24 °C for all species (Figure). No growth occurred at ≥ 32 °C but all strains except two strains of *A. applanata* survived at this temperature, whereas 36 °C was lethal for all strains. PAC species differed most significantly in growth rates at 24 and 28 °C. Growth rates were lowest for *A. applanata* over the whole range of temperatures, but growth reduction compared to the other species was most pronounced between 16 and 28 °C. Thus, other PAC species could outcompete *A. applanata* under global warming. The consequences of species replacements and species extinctions are largely unknown, but both could destabilize the networks among PAC and between PAC and hosts. For example, if PAC species which provide biological control against root pathogens (C. Tellenbach, personal communication) are replaced or become extinct frequency of disease epidemics is expected to increase. Competition among PAC species and PAC-host interactions are currently being studied under a global warming scenario in vitro to keep interferences of uncontrolled factors as low as possible and to examine temperature per se.

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The study makes part of the GEDIHAP project:

www.cces.ethz.ch/projects/feh/gedihap/Layer2/WP1b

References available from the authors