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Materials Science & Technology

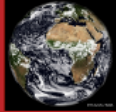


C2SM Newsletter October 2014

Vol. 16

“Innovationen fürs Klima”

C2SM and the Energy Science center (ESC) of ETH are jointly organizing the second edition of Klimarunde. Following the release of the IPCC synthesis report SYR, this year’s topic addresses “innovations for the climate”. On Wednesday November 5 2014, leading experts are discussing emerging innovations for a transition into a greenhouse gas emission free future of our energy system. Speakers and panelists include Ottmar Edenhofer (PIK Potsdam), Jasmin Staiblin (CEO Alpiq), Walter Steinmann (director Bundesamt für Energie), Toni Patt (ETH Zurich), Kees Christiaanse (ETH Zurich).



ETH-Klimarunde
«Innovationen fürs Klima» – Was braucht es, damit wir handeln können?
Wednesday, 5 November 2014, 3.30 – 7 pm, ETH Zurich, Main Building
#klimarunde

Follow the discussions of the #klimarunde on Twitter. Or send your question to the podium to klimarunde2014@env.ethz.ch.

Please register before October 31 2014:

<http://www.c2sm.ethz.ch/klimarunde2014>

2014 Community day

The C2SM Community day brings together the C2SM Community from PhD students to the directors of the partner institutions to learn more about support opportunities provided by C2SM, help shape the future of the Center, and have informal exchange with long-term colleagues and new faces. Please register no later than November 15 by sending an email to isabelle.bey@env.ethz.ch.

Combining atmospheric research with supercomputing

The project „Cloud-resolving climate modeling on future supercomputing platforms” (crClim) was recently funded through the Sinergia Programme of the Swiss National Science Foundation. It builds on strong collaborations between atmospheric, climate and computer computer sciences that has recently established a COSMO prototype version running on GPU processors. C2SM members Christoph Schär (<http://www.iac.ethz.ch/groups/schaer>) and Heinig Wernli (<http://www.iac.ethz.ch/groups/wernli>) (both ETH IAC) are part of the team including Oliver Fuhrer (<http://www.meteoschweiz.admin.ch/web/en.html>, MeteoSwiss), Torsten Hoefler (ETH SPCL <http://spcl.inf.ethz.ch>) and Thomas Schulthess (<http://www.cscs.ch>, Swiss National Super Computing Center CSCS). The goal of the project is to develop and exploit a European-scale climate model that is capable to resolve convection at a grid-spacing of 2 km. The project will exploit and further develop the recently established COSMO prototype version running on GPU processors.

Fire in the climate system

Fire plays an important role in the climate system. The project "Paleo fires from high-alpine ice cores" wants to advance the understanding of linkages between climate, land use, fire and vegetation by combining ice-core records with modeling. C2SM member Ulrike Lohmann (<http://www.iac.ethz.ch/groups/lohmann>) will collaborate with researchers from PSI and the University of Bern. Funded by the Swiss National Science Foundation SNSF Sinergia the project focuses on different regions over the most recent period of the last 150 years in comparison to the previous 2000 years.

Changes in the C2SM core staff

Anne Roches (scientific programmer / regional climate modeler) and This Rutishauser (outreach and communication) are leaving C2SM by the end of the year. Anne will look for new opportunities to extend her skill set and to tackle new challenges. This will be focusing on citizen science projects related to climate change impact observations together with developing his skills in corporate publishing.

A position for a scientific programmer is being currently advertised: <https://pub.refline.ch/845721/3520/++publications++/1/index.html>.

Access to CORDEX-Europe simulations

C2SM is mirroring the Earth System Grid Federation (ESGF)-archive that contains the results of the CORDEX-Europe simulations. The archive currently holds about 18TB of data and the mirror is continuously updated. Researchers with access to the IAC network can access these data in "/net/atmos/data/CORDEX". Researches with access to CSCS filesystems can access these data at ela.cscs.ch/store/c2sm/c2sme/cordex. The mirror at CSCS usually lags behind IAC a couple of weeks. For any questions, contact Harald von Waldow (hvwaldow@env.ethz.ch)

Downloading large data sets

C2SM announces the release of "Esget" - a software system to bulk download very large volumes of data from the ESGF distributed database. The output of many climate-related simulation projects is distributed via ESGF, e.g. CORDEX, CMIP5, GeoMIP and PMIP3. Esget is written in Python and its features include:

- tracking of local files
- accepts arbitrary dataset-definitions
- automatic selection of ESGF query-nodes
- uses multiprocessing for ESGF-queries and downloading
- uses an arbitrary large number of hosts for parallel downloading
- state is kept in a SQLite-database

Feel free to contact Harald von Waldow <hvwaldow@env.ethz.ch> for assistance in case you want to try it out. In particular those workgroups that have neither access to IAC nor to CSCS storage might be interested to install Esget software on their systems. Esget is open-source and can be downloaded from GitHub:

<https://github.com/hvwaldow/esget>.

Gridded daily data from CH2011+

The CH2011+ initiative has officially released the "Gridded-Daily" dataset. This dataset is an extension to that presented in the CH2011 report. "Gridded-Daily" contains predictions of changes in near-surface temperature at 2 m above ground and precipitation for three periods (2020-2049, 2045-2074, and 2070-2099) conditional on three different emission scenarios (A1B, A2, RCP3PD). For each prediction period there are daily mean values for 365 Julian days (a "typical year"). The data covers Switzerland at a resolution of about 2 km on a regular grid. To represent the model- and climate uncertainty of the prediction, the data contains an "upper" and a "lower" estimate in addition to the "middle" estimate.

The data can be downloaded from here:

<http://data.c2sm.ethz.ch/dataset/ch2011plus/>

Key climate indices and localized climate change scenarios for Switzerland

Climate indices facilitate the interpretation of expected climate change impacts for many sectors in society, economy, and ecology. New localized data sets of climatic change signals for temperature and precipitation were applied for an analysis of frequently used climate indices in Switzerland. The scenario data suggest (1) a doubling of the number of summer days by the end of the century under the scenarios A1B and A2, (2) an appearance of tropical nights even above 1500 m asl, (3) a possible reduction of the number of frost days by more than 3 months at altitudes higher than 2500 m asl, (4) a decline of heating degree days by about 30 % until the end of the century, and (5) the near disappearance of days with fresh snow at low altitudes. It is also shown that the end-of-the-century projections of all indices strongly depend on the chosen emission scenario.

Zubler, E. M., Fischer, A. M., Liniger, M. A., Croci-Maspoli, M., Scherrer, S. C., & Appenzeller, C. (2014a). Localized climate change scenarios of mean temperature and precipitation over Switzerland. Climatic Change, 125, 237-252, DOI:

10.1007/s10584-014-1144-x. Zubler, E. M., Scherrer, S. C., Croci-Maspoli, M., Liniger, M. A., & Appenzeller, C. (2014b). Key climate indices in Switzerland; expected changes in a future climate. Climatic Change, 123(2), 255-271. doi:10.1007/s10584-013-1041-8

No-till farming mitigates extreme heat

A new study led by Edouard Davin and Sonia Seneviratne from the C2SM network investigates the impact of no-till farming for regional climate in Europe. Among other effects, no-till farming leads to a higher surface albedo and lower soil evaporation due to the presence of crop residues on the soils. The study published in the Proceedings of the National Academy of Science (PNAS) reveals that the combined impacts of surface albedo and soil evaporation can reduce temperatures in heat waves by as much as 2 °C.

Find the full paper here: <http://www.pnas.org/content/111/27/9757>

Read two reports on the paper here: <https://www.ethz.ch/en/news-and-events/eth-news/news/2014/06/cropland-albedo.html> and here

<http://www.nature.com/news/unploughed-fields-take-edge-off-heatwaves-1.15438>

Natural variability and radiative forcing explain “hiatus”

Why has global mean surface warming over the past 15 years been less than in earlier decades and less than simulated by most climate models? Markus Huber and C2SM member Reto Knutti found that internal variability (El Niño/Southern Oscillation, ENSO) and updated solar and stratospheric aerosol forcings from observations can explain the difference. Their study was recently published in "Nature Geoscience". An adjusted climate model of reduced complexity was shown to be consistent with the temperature record of the past 15 years. There is little evidence for a systematic overestimation of the temperature response to increasing atmospheric CO₂ concentrations in a large number of climate models (CMIP5 ensemble), the authors found.

Huber and Knutti (2014), *Nature Geoscience*, DOI: 10.1038/ngeo2228

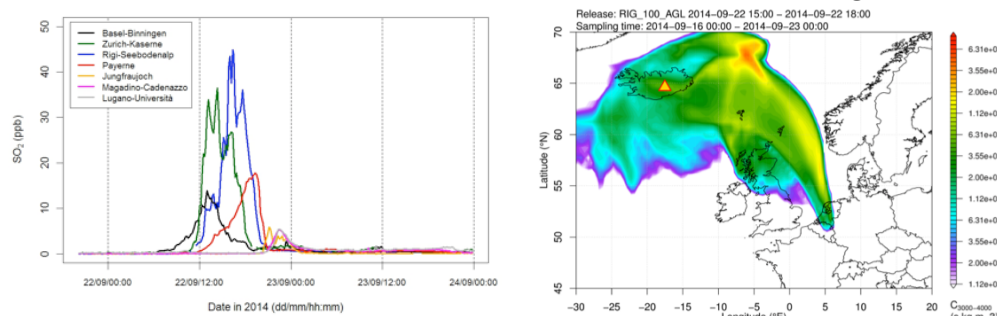
<http://www.nature.com/ngeo/journal/v7/n9/abs/ngeo2228.html>

Ecology professor, species distribution modeling, C2SM member

C2SM member Niklaus Zimmermann was named Adjunct Professor at ETH Zurich. He is also a member of the Board of Management of WSL and Lecturer at ETH Zurich. Niklaus Zimmermann scientific achievements include influential publications: He played a key role in the development of species distribution modelling, which is now used to investigate a wide range of ecological questions.

<http://www.ethrat.ch/en/medien-medienmitteilungen/7-new-professors-two-federal-institutes-technology>

Icelandic volcano SO₂ emissions found at Swiss measuring sites



Unusually high SO₂ concentrations were measured in late September at several sites in Switzerland and across Europe. The highest levels in Switzerland were measured at the NABEL mountain site Rigi with 40 ppb SO₂ (figure, left panel), suggesting a distant rather than a regional source. A backward simulation with the Lagrangian transport model FLEXPART initiated at Rigi identifies the Icelandic volcano Bardarbunga as the most likely source of these exceptionally high concentrations (figure, right panel). These simulations suggest that the initial volcanic plume reached up to about 3 kilometers above the volcano. These observations are reminding us of the eruption of the Icelandic volcano Eyjafjallajökull in April 2010, which led to the disruption of European air travel for several days. However, while the eruption of Eyjafjallajökull was associated with a massive release of fine ash but only little gaseous SO₂, Bardarbunga so far shows an opposite behavior with large releases of SO₂. Measurements from Lidars by MeteoSwiss showed nevertheless layers of enhanced aerosol concentrations most likely attributable to the volcano. It will thus be important to monitor the further evolution of the volcano and its potential threat for the European air space.

200 years after Tambora

C2SM member Thomas Peter is co-organiser of the International Conference "Bicentenary of the great Tambora eruption". The conference on Volcanoes, Climate, and Society commemorating two hundred years after the eruption of the Tambora volcano in April 1815 will take place 7 – 11 April 2015 at the University of Bern.

Abstract submission is due on October 31:

<http://www.oeschger.unibe.ch/events/conferences/tambora/>

Weather Prediction, Air Quality and Climate Research

The Symposium on Coupled Chemistry-Meteorology / Climate Modelling (CCMM) will take place at WMO headquarters in Geneva from 9-11 February 2015. A large number of topics will be discussed related to status and relevance for Numerical Weather Prediction, Air Quality and Climate Research.

More general information: <http://eumetchem.info/>

Symposium information:

http://www.eumetchem.info/index.php?option=com_banners&task=click&bid=3&language=en

What's new @ Climate-KIC?

Climate-KIC has undergone quite a journey since its inception in 2010 and the community of climate change mitigation and adaptation innovators has grown to over 250 partner organisations, >60 projects, >1000 alumnis of our education programme and >100 start-ups being supported. The yearly funding from the EU has grown from 5Mio Euro in 2010 to 75 Mio Euro in 2014 and is likely to continue to grow to 100 Mio Euro per year. The Swiss co-location centre is currently involved in 16 projects amongst which is the new flagship Building Technologies Accelerator (BTA) which is led by ETH Zurich. This event aims to strengthening ETH's involvement and position within the Climate-KIC community.

Register to the event on December 4th here: <http://bit.ly/1wD6oiz>

Climate Impacts and Adaptation in Agricultural Systems

C2SM member Jürg Fuhrer edited a book on "Climate Impacts and Adaptation in Agricultural Systems". The focus of this book is future global climate change and its implications for agricultural systems which are the main sources of agricultural goods and services provided to society. These systems are either based on crop or livestock production, or on combinations of the two, with characteristics that differ between regions and between levels of management intensity. In turn, they also differ in their sensitivity to projected future changes in climate, and improvements to increase climate-resilience need to be tailored to the specific needs of each system. The book brings together a series of chapters that provide scientific insights to possible implications of projected climate changes for different important types of crop and livestock systems, and a discussion of options for adaptive and mitigative management.

More information: <http://www.cabi.org/bookshop/book/9781780642895>

Award for COSMO-1 visualization

A collaborative effort between C2SM associated scientists at ETHZ (Oliver Stebler, Urs Beyerle and Reto Knutti) and MeteoSwiss (Oliver Fuhrer and Reto Stöckli) has resulted in a very impressive visualization of a high-resolution (1.1 km, 2 min) simulation produced by the experimental weather model COSMO-1 that is currently developed at MeteoSwiss. This visualization was nominated as the second best visualization presented at the recent Platform for Advanced Scientific Computing (PASC) Conference.

<https://www.youtube.com/watch?v=DI16KSH8vV8>

Data website for CH2014-IMPACTS online

There is an interactive website for the CH2014-IMPACTS report, from where the data used for the various studies can be eventually downloaded.

<http://ch2014.unibe.ch/>

Gewässerschutz, Extraterrestrial climate, ice research

A number of new "Werkstattgespräche" are now available on the vimeo-page of Climate Science visuals. The talks include interviews with Ulrike Lohmann (<http://vimeo.com/104689819>), Bernhard Wehrli (<http://vimeo.com/103980786>), Koni Steffen (<http://vimeo.com/94520236>), Nicolas Gruber (<http://vimeo.com/105655087>) and Tapio Schneider (<http://vimeo.com/96192021>).

Technical training workshops

C2SM co-organized two technical workshops on regional climate modelling and on the Python software. Check the C2SM website for future workshops on technical skills in climate modeling and data visualisation. On the same website you can also suggest topics for future technical trainings.

<http://www.c2sm.ethz.ch/education>

100 years of accumulation and melting on a glacier

Scientists have been measuring the accumulation and melting of ice on the Claridenfirn in the Canton of Glarus constantly for a century. Glacier researcher Andreas Bauder explains what makes these measurements so special and what can be concluded from them. The centennial celebrations of the measurements also included a Symposium held at ETH

<https://www.ethz.ch/en/news-and-events/eth-news/news/2014/08/Valuable%20long-term%20data.html>. <http://snow-ice-permafrost.ch/en/clariden100/>

"Klimarunde 2013" featured in the annual report of ETH.

"ETH-Klimarunde" was prominently mentioned in the annual report 2013 of ETH. It states that "imparting knowledge and maintaining a dialogue with society, industry and politics is important to ETH Zurich." "ETH-Klimarunde" was one of the events in 2013 that offered scientists the opportunity to present their work for the UN climate report and discuss it with the public, the annual report says. Read the full report here:

https://www.ethz.ch/content/dam/ethz/common/docs/publications/annual-reports/2013/ETH_Annualreport_2013_updated.pdf

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