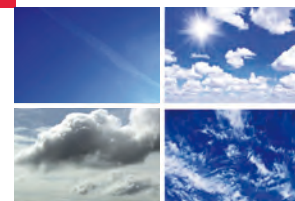


ProClim– Flash

No 57, June 2013



National Framework for Climate Services

Editorial, französische Übersetzung anschliessend



Prof. Christof Appenzeller, Bundesamt für Meteorologie und Klimatologie MeteoSchweiz

Dass sich das globale Klima weiter erwärmen wird, ist unter Wissenschaftlern unbestritten. Hingegen ist noch unklar, wie die globale Politik eine international tragfähige Lösung zur Minderung des Klimawandels (Mitigation) finden soll. Auch wer optimistisch bleibt, kommt nicht darum herum, sich Gedanken um eine mögliche Anpassung an den Klimawandel (Adaptation) zu machen. Das hat den Bundesrat dazu veranlasst eine Anpassungsstrategie zur Bewältigung des Klimawandels zu entwickeln. In dieser Strategie werden Handlungsfelder für verschiedene Sektoren identifiziert, um frühzeitig Massnahmen zur Risikominimierung einzuleiten und mögliche Chancen zu nutzen.

Um geeignete Entscheidungen zu treffen, brauchen Politik und Wirtschaft verlässliche und aktualisierte Grundlagen, welche Informationen über das heutige und vergangene Klima (Beobachtungen und Monitoring), die zu erwartende Entwicklung (Wissenschaft, Modelle und Prognose) des Klimas und der betroffenen Gesellschafts- und Wirtschaftssektoren enthalten. Die enge Zusammenarbeit mit den Sozial- und Naturwissenschaften stellt sicher, dass die Informationen dem neusten Wissensstand entsprechen (siehe Darstellung nächste Seite).

Die Basis für das Monitoring sind Datenerhebungen. Die langjährigen Beobachtungen zeigen,

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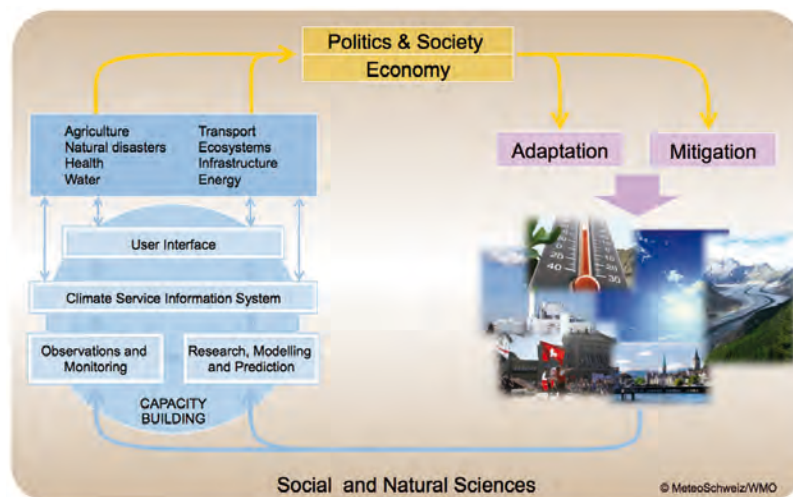
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Science and Policy
Platform of the Swiss Academy of Sciences
ProClim–
Forum for Climate and Global Change

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Die Rolle der Climate Services (mit blauem Kreis markiert) im politischen und wirtschaftlichen Entscheidungsprozess.
Le rôle des services climatologiques (marqués par un cercle bleu) dans le processus de décision politique et économique.
 Source: MeteoSchweiz / WMO

dass sich der Klimawandel auch in der Schweiz nachweisen lässt.

Klimaszenarien

Doch wie steht es mit den Prognosen und den Klimaszenarien für die Schweiz? Der neue IPCC-Bericht, welcher im Herbst 2013 erscheint, enthält Szenarien für die zu erwartende Entwicklung der globalen Treibhausgase und Klimaparameter. Für die Schweizer Anpassungsstrategie und das Klimarisikomanagement werden jedoch detailliertere Informationen auf regionaler und lokaler Skala benötigt. Die erwartete Veränderung der saisonalen mittleren Klimawerte sind wenig hilfreich, wenn man z.B. über bauliche Massnahmen im Zusammenhang mit einem möglichen steigenden Hochwasserrisiko im Berner Oberland entscheiden muss. Darüber hinaus ist zumeist nur vage bekannt, wie die heutige natürliche Klimavariabilität und ihre Risiken in Entscheidungen einbezogen werden müssen. Oft fehlen dazu aktualisierte Klimagrundlagen, welche die neusten Messdaten und Methoden berücksichtigen. Viele weitere, ebenso wichtige Fragenkomplexe wie beispielsweise der Einfluss der zu erwartenden politischen und wirtschaftlichen Entwicklungen oder die Anpassungsfähigkeit eines Wirtschaftssektors müssen miteinbezogen werden.

Plattform für Anwender

Entscheidungsgrundlagen müssen praxisnah erarbeitet werden, so dass sie für die sektorspezifischen Anwender nutzbar sind. Dazu reicht es nicht elektronische Daten auf einer Webseite zu publizieren, sondern es braucht einen nachhaltigen Dialog zwischen den Herstellern von Klimainformationen und den sektorspezifischen Nutzern. Dazu gehört auch ein koordiniertes Informationssystem für alle Beteiligten.

Internationale Einbettung

Solche Dienstleistungen (blauer Kreis in Darstellung oben) werden international als «Climate Services» bezeichnet. Sie sind ein zentrales Element, um Klimarisiken zu erkennen und mögliche Chancen zu nutzen. Dies hat die Weltorganisation für Meteorologie (WMO) erkannt und darum das Global Framework for Climate Services (GFCS) etabliert, welches den Nationalstaaten empfiehlt ihre Klimadienstleistungen zu stärken. Bundesrat Alain Berset betonte in seiner Eröffnungsrede am WMO Kongress 2012 die Bedeutung dieser Dienstleistungen sowohl für die Schweiz als auch für die Entwicklungsländer, in denen ein systematischer Aufbau von Infrastruktur und Expertenwissen notwendig sein wird. Auch unsere Nachbarstaaten sind dabei, die Climate Services durch den Aufbau neuer Zentren oder die Entwicklung spezieller Programme zu stärken.

Fazit

Will sich die Schweiz erfolgreich auf die Herausforderungen des Klimawandels vorbereiten und mit den heutigen klimabedingten Risiken kosteneffizient umgehen, sollte sie die zentralen Anliegen des globalen GFCS umsetzen. Ein solches National Framework for Climate Services (NFCS) müsste nicht bei Null beginnen. Es könnte auf Erfahrungen der relevanten Bundesämter, Hochschulen und Pilotprogramme aus Forschungsprojekten wie z.B. dem nun abgeschlossenen NCCR-Climat aufbauen. Das NFCS könnte ein dauerhaftes Netzwerk für Bundesämter, Wissenschaft und Anwender ermöglichen und die Finanzierung der Basisdienstleistungen und -infrastruktur nachhaltig sicherstellen.

Un cadre national pour les services climatologiques

Prof. Christof Appenzeller, Office fédéral de météorologie et de climatologie MétéoSuisse

Le climat global continuera de se réchauffer: cela ne fait pas de doute parmi les scientifiques. Mais quelle solution viable au niveau international permettrait-elle d'atténuer les changements climatiques? A cette question, la politique mondiale n'a pas encore trouvé de réponse claire. Même en restant optimiste, on ne peut s'empêcher de réfléchir à une possible adaptation à ces changements. C'est ce qui a motivé le Conseil fédéral à élaborer une stratégie d'adaptation en ce sens. Dans cette stratégie, des champs d'action sont identifiés pour différents secteurs; ils devraient permettre de prendre à temps des mesures pour minimiser les risques des changements climatiques, mais aussi pour tirer parti des chances éventuelles qu'offrent ces changements.

Pour prendre des décisions judicieuses, les milieux politiques et économiques ont besoin de bases fiables et à jour, comprenant des informations sur le climat présent et passé (observations et suivi) et sur l'évolution probable (science, modèles et prévisions) du climat et des secteurs concernés de la société et de l'économie. Une étroite collaboration avec les sciences sociales et naturelles doit garantir que ces informations correspondent à l'état le plus récent du savoir (voir illustration page 2).

Le suivi se fonde sur la saisie de données. De longues années d'observations montrent que le changement climatique se manifeste aussi en Suisse.

Scénarios climatiques

Mais quels sont les prévisions et les scénarios climatiques pour la Suisse? Le nouveau rapport du GIEC, qui paraîtra en automne 2013, contient des scénarios pour les évolutions des gaz à effet de serre et paramètres climatiques auxquels il faut s'attendre au niveau planétaire. Toutefois, la stratégie d'adaptation suisse et la gestion des risques climatiques nécessitent des informations plus détaillées à l'échelon régional et local. Les changements attendus des valeurs climatiques saisonnières moyennes sont de peu d'aide s'il s'agit, par exemple, de décider de mesures de génie civil en rapport avec une hausse possible du risque de crues dans l'Oberland bernois. En outre, on n'a le plus souvent qu'une vague idée sur la manière de prendre en considération dans des décisions l'actuelle variabilité naturelle du climat et ses risques. Des connaissances climatologiques de base, tenant compte des données et méthodes les plus récentes, font souvent défaut à ce sujet. De nombreuses autres questions, tout aussi importantes, doivent être incluses dans la réflexion – par exemple l'influence des dévelop-

pements politiques et économiques auxquels il faut s'attendre, ou la capacité d'adaptation de tel ou tel secteur économique.

Une plate-forme pour les utilisateurs

Les bases de décision doivent être proches de la pratique, de manière à convenir à des utilisateurs de secteurs spécifiques. Il ne suffit pas pour cela de publier des données électroniques sur un site web, mais il faut un dialogue soutenu entre les producteurs d'informations climatiques et les utilisateurs de secteurs spécifiques. Ceci implique notamment un système d'information coordonné pour tous les participants.

Intégration internationale

Au niveau international, de telles prestations (cercle bleu dans le graphique page 2) sont appelées «services climatologiques» («climate services»). Elles constituent un élément essentiel pour identifier les risques climatiques et d'éventuelles chances à exploiter. L'Organisation météorologique mondiale (OMM) l'a bien compris. C'est pourquoi elle a institué le Cadre mondial pour les services climatologiques (CMSC), qui recommande aux Etats nationaux de renforcer leurs prestations de services en matière de climat. Dans son discours à l'ouverture du congrès 2012 de l'OMM, le Conseiller fédéral Alain Berset a souligné l'importance de ces services, pour la Suisse autant que pour les pays en développement, dans lesquels il faudra systématiquement créer des infrastructures et promouvoir du savoir d'experts. Nos Etats voisins aussi sont en train de renforcer leurs services climatologiques par l'instauration de nouveaux centres ou le développement de programmes spécifiques.

Conclusion

Si la Suisse entend se préparer avec succès aux défis des changements climatiques et aborder de façon efficace et économique les risques actuels associés au climat, elle doit mettre en œuvre à son échelon les objectifs du CMSC. Un Cadre national pour les services climatologiques (CNSC) ne commencerait pas à zéro. Il pourrait s'établir sur l'expérience que des offices fédéraux, hautes écoles et programmes pilotes ont tirées de projets de recherche tels que le «NCCR Climate», achevé récemment. Le CNSC offrirait à des offices fédéraux, des scientifiques et des utilisateurs la possibilité de se mettre en réseau de façon durable et garantirait à long terme le financement des services et infrastructures de base.

Swiss Climate Research at a Glance

Concerted efforts for Reduced Emissions from Deforestation and Forest Degradation

Insights on research and policy advice at HAFL

About one-sixth of global greenhouse gas emissions stem from the destruction of forests. REDD+ (Reducing Emissions from Deforestation and Forest Degradation) is an international effort that seeks to provide incentives for developing countries to curb their deforestation rates. The Forest Carbon Partnership Facility (FCPF, www.forest-carbonpartnership.org), managed by the World Bank, along with UN-REDD, managed jointly by UNEP, UNDP and FAO, are the two largest multilateral pilot programs engaged in the development of REDD+ policies. More than 50 developing countries are preparing their national REDD+ strategies in either one of these global initiatives. Entrusted by the State Secretariat for Economic Affairs (SECO), Prof. Jürgen Blaser of the Bern



Natural Indian teak dry forests in the area of tension between protection and benefit for a local population.
Photo: Jürgen Blaser

University of Applied Sciences (HAFL) represents Switzerland within the FCPF. Together with his research team, he is engaged in contributing to the design of the carbon fund's framework rules. The various and complex issues span from defining reference levels, i.e. counterfactuals to measure reduced deforestation, over questions of providing safeguards (e.g. participation of indigenous people in conservation of forests), to methods to include the wider benefits of ecosystem services in REDD+ and of sharing carbon benefits in recipient countries. Moreover, the group is actively supporting Togo in the preparation of its REDD+ Readiness Proposal toward the FCPF.

With support from the Federal Office for the Environment (FOEN), the research group is now launching a project to develop a regional forest

monitoring system concept for the West African region. It will help monitor whether emissions are being reduced, and whether social and environmental benefits are being addressed. Advancing REDD+ on the ground in Africa is a way to generate experience and channel best practices into the international climate policy arena. In the UN Framework Convention on Climate Change and the Convention on Biodiversity, FOEN leads a coordinated effort of the Swiss federal government agencies to support development of REDD+. Further information can be found at:

www.bafu.admin.ch/wald/01152/01169/11759

REDD+ is already delivering simultaneous climate and development benefits in many developing countries and international policy guidance is key to its consolidation.

Reducing CO₂ emissions from the destruction of tropical forests is a priority area of Swiss climate and development policy. For many developing countries, forests have the largest mitigation potential of any sector and under the future climate regime are expected to be at the heart of their emission reduction pledges.

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Le bois au service du virage énergétique et climatique

Le Programme national de recherche «Ressource bois» (PNR 66), qui bat son plein actuellement avec plus de 110 chercheurs actifs dans 30 projets, désire apporter les premiers résultats en janvier 2015. Pour réussir ensuite le transfert vers la pratique, le dialogue entre les acteurs concernés et la mise en réseau doivent avoir lieu dès maintenant. Les forêts suisses regorgent de près de 400 millions de mètres cubes de bois, dont environ cinq millions sont exploités chaque année. Les décideurs et les politiques se posent la question actuellement comment accroître l'exploitation du bois, à quel prix et pour quels avantages. Différentes politiques sectorielles au niveau de la Confédération confèrent aux ressources renouvelables une importance grandissante, et en particulier pour le bois. La Stratégie énergétique 2050 prévoit une contribution de la biomasse bois à la fois sous forme de gaz pour produire de l'électri-

citée et sous forme de matière première pour produire de la chaleur. La nouvelle politique forestière vise à l'horizon 2030 une contribution accrue de la forêt et du bois dans la politique climatique et dans la réduction des émissions de CO₂.

Plusieurs projets de recherche du PNR 66 ont donc pour but de permettre une transformation du bois en chaleur, électricité voire même en carburant, avec un rendement maximum, tout en minimisant les émissions toxiques. Il s'agit d'un côté d'améliorer les technologies actuelles dans les chaudières pour combustibles ligneux par exemple et d'un autre côté, de développer de nouvelles technologies pour produire de l'hydrogène de grande pureté à base de bois et pour produire du gaz naturel synthétique issus du bois (appelé communément «bio-SNG»).

Un des potentiels encore sous-exploité du bois est certainement aussi dans la construction. Afin d'augmenter la compétitivité du bois en tant qu'alternative aux matériaux d'origine fossile, et ainsi contribuer au stockage du CO₂, des projets de recherche se consacrent à rendre les structures en bois encore plus fiables en terme mécanique, acoustique, sismique et technique d'assemblage. Mais rien ne sert de disposer de technologies si l'on ne peut pas assurer la disponibilité et l'approvisionnement du bois. Des outils d'aides à la décision technologique, économique et politique



Projet 22 dirigé par la Prof. Andrea Frangi (EPF Zurich): «Nouveaux types de structures porteuses de haute fiabilité en bois de hêtre». Source: F. Gribi, 2013.

sont également en cours de développement dans le cadre du PNR 66.

Afin de préparer un transfert optimal de toutes ces nouvelles connaissances et technologies dans le domaine énergétique en particulier, le PNR 66 va lancer cette année encore une plateforme de dialogue entre les milieux de la recherche, de l'économie forestière et des producteurs énergétiques. Un des objectifs sera de clarifier les besoins et les conditions-cadres nécessaires afin de renforcer la place du bois parmi les technologies propres et durables en Suisse.

Auteur: Enrico Bellini, responsable ad interim du transfert de connaissances et de technologie (TCT) du PNR 66, bureau Infraconsult SA à Berne.

News

Heinz Gutscher elected into the Scientific Steering Committee of Future Earth

Based on the nomination of the Swiss Academy of Sciences (SCNAT), Heinz Gutscher has been elected by the International Council for Science (ICSU) and the International Social Science Council (ISSC) into the scientific Steering Committee of Future Earth. Future Earth – the new research program on sustainability will replace the three Global Change Research Programs IGBP, IHDP and Diversitas. It will have close ties with the WCRP. You can find the Future Earth description and the Draft Science Plan at: www.proclim.ch/News?2846

Future Earth has evolved – needs strong national and regional nodes

The concept of the Future Earth research program for global sustainability has evolved substantially since its first draft from summer 2012. Future Earth now actively tries to integrate the core projects of the present global change programs.

The main goal of Future Earth remains: to answer fundamental questions about how and why the global environment is changing, what are the likely future changes, what are the implications for humans and other species and what opportunities reduce risks and vulnerabilities and

enhance resilience in all regions of the world. But now Future Earth explicitly acknowledges that not all projects must be co-designed by stakeholders, and the need of fundamental research activities as equal parts (see Figure below).

The research is grouped around three key research themes:

- **Dynamic Planet (process understanding):** Observation, projection and understanding of the earth system as well as environmental and societal trends. Some of the topics are already addressed within existing GEC projects.
- **Global Development (target knowledge):** Knowledge about targets for a sustainable, secure and fair stewardship of the key problem such as food, water, ecosystem services, energy.
- **Transformation toward Sustainability (transformation knowledge):** Understanding transformation processes and how to manage change across sectors and scales respecting human values.

Call for bids for energy competence centres

In its Dispatch on the Coordinated Energy Research in Switzerland Action Plan, the Federal Council announced measures to promote energy research as part of the federal Energy Strategy 2050. One of these measures involves the creation of research networks between higher education institutions,

the Swiss Competence Centres for Energy Research (SCCERs), which will pursue research in seven action areas. The call for bids for these centres is being launched on May 23rd 2013.

Seventy two million francs have been earmarked between 2013 and 2016 to establish the competence centres. During this period the SCCERs will be evaluated on an ongoing basis and will continue to operate into the next ERI dispatch period (2017 to 2020) provided they meet the expectations formulated in their objectives. The SCCERs are the CTI's new approach to addressing the problems posed by the energy revolution, and to encouraging innovation. An additional 46 million francs have been made available for conventional support of research and development projects in the energy field. Institutions not involved in the SCCERs can also apply for this funding. There are still sufficient funds available to support projects in other fields.

The SCCERs will be set up in the following seven areas: efficiency; grids and their components; energy systems; storage; power supply; Economy-environment-law-behaviour; efficient concepts-processes-components in mobility and biomass. Bids must be submitted to the CTI by 9 July 2013. It should be possible to conclude agreements with the first SCCERs by the end of 2013.

You can find the «Call for bids 2013 Swiss Competence Centres for Energy Research SCCER» at: www.proclim.ch/News22835

Source: Commission for Technology and Innovation CTI

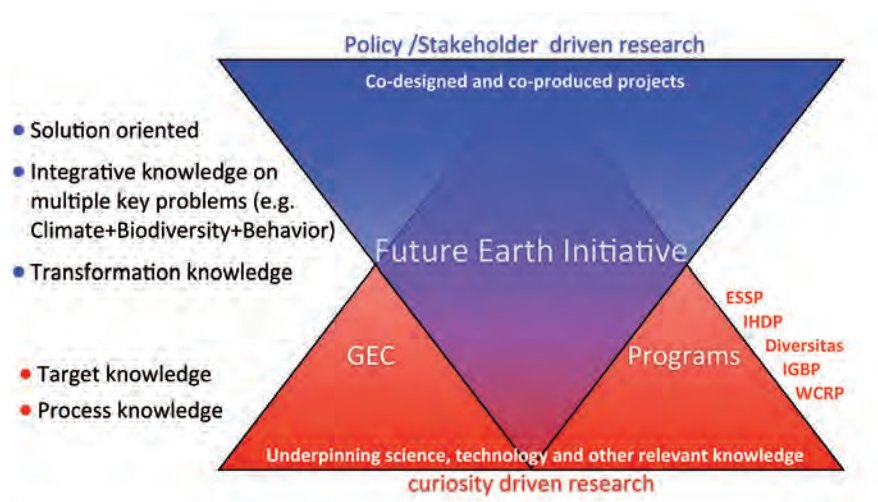


Figure: Integration of Policy/Stakeholder and Curiosity driven research within Future Earth.
Source: C. Ritz, ProClim-

Treibhausgasemissionen 2011

Treibhausgasinventar des Bundesamtes für Umwelt

Gaz à effet de serre en 2011

L'inventaire des émissions de l'OFEV

(deutsch) Gemäss Treibhausgasinventar des Bundesamtes für Umwelt wurden 2011 in der Schweiz 4,1 Millionen Tonnen weniger Treibhausgase ausgestossen als im Vorjahr. Zwei Drittel dieses Rückgangs gehen auf die milderen Temperaturen während der Heizperiode und ein Drittel auf ein geringeres Wirtschaftswachstum und die Reduktionsanstrengungen der öffentlichen Hand, der Wirtschaft und der Privaten zurück. Diese Reduktionen dürften dazu beitragen, dass die Schweiz ihre Kyoto-Verpflichtung für 2008 bis 2012 voraussichtlich einhalten kann.

Im Rahmen des Kyoto-Protokolls hat sich die Schweiz zu einer Verminderung der Treibhausgasemissionen um 8 Prozent im Mittel der Jahre 2008 bis 2012 gegenüber 1990 verpflichtet. Die im Treibhausgasinventar ausgewiesenen Emissionen sind ein wichtiges Element für die Beurteilung der Kyoto-Zielerreichung. Weitere Elemente sind die Senkenleistung des Waldes und der Kauf von ausländischen Emissionsminderungszertifikaten. Senken und Zertifikate erlauben zusätzliche Treibhausgasemissionen. Die definitive Abrechnung über die Erreichung der Kyoto-Ziele wird erst 2014 vorliegen, wenn die Emissionsdaten bis Ende 2012 bekannt sind. Eine erste Berechnung zeigt, dass die Schweiz ihr

Kyoto-Ziel voraussichtlich knapp einhalten kann. Grafiken und Faktenblatt unter:

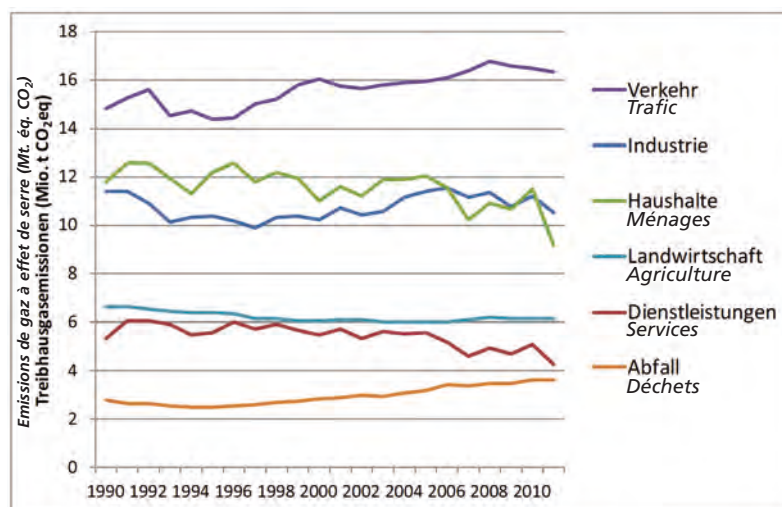
www.proclim.ch/News?2775.

Quelle: BAFU

(français) En 2011, la Suisse a émis 4,1 millions de tonnes de gaz à effet de serre (GES) de moins que l'année précédente, selon l'inventaire suisse des émissions de GES de l'OFEV. Ce recul est imputable pour deux tiers à des températures plus douces pendant la saison de chauffage et pour un tiers à un ralentissement de la croissance économique ainsi qu'aux efforts de réduction des secteurs public et privé et de l'économie. Ces efforts devraient contribuer à permettre à la Suisse de remplir ses engagements de Kyoto pour la période de 2008 à 2012.

Dans le cadre du Protocole de Kyoto, la Suisse s'est engagée à réduire ses émissions de GES de 8 % en moyenne entre 2008 et 2012 par rapport à 1990. Pour savoir si elle a atteint son objectif, elle se base avant tout sur l'inventaire des émissions de GES, mais prend aussi en compte l'effet de puits de carbone des forêts suisses et l'acquisition de certificats étrangers, qui permettent de compenser les émissions de GES supplémentaires. Il faudra attendre 2014 pour un bilan définitif incluant les données jusqu'à fin 2012. Selon une première estimation, la Suisse devrait réussir à atteindre son objectif de Kyoto. Fiche et illustrations sur: www.proclim.ch/News?2776.

Source: OFEV



Entwicklung der Treibhausgasemissionen 1990–2011 in Millionen Tonnen CO₂-Äquivalenten.
Evolution des émissions de gaz à effet de serre de 1990 à 2011 en millions de tonnes d'équivalent CO₂.

Quelle: BAFU / Source: OFEV

Publications

Welt im Wandel: Menschheitserbe Meer WBGU Gutachten 2013



Trotz zahlreicher völkerrechtlicher Abkommen und freiwilliger Verpflichtungen werden die Meere immer noch massiv überfischt, verschmutzt und zunehmend als letzte grosse Ressourcenquelle der Erde ausgebeutet. Den schlechten Zustand der Meere nimmt der WBGU jetzt zum Anlass, eine langfristige Vision für einen nachhaltigen Umgang mit dem blauen Kontinent zu entwickeln: Alle Meereszonen mit Ausnahme des Küstenmeeres sollten zum gemeinsamen Erbe der Menschheit erklärt werden.

Um diesem Fernziel für die Meeres-Governance näher zu kommen stellt der WBGU zusätzlich Handlungsempfehlungen vor, die an laufende Politikprozesse anschliessen. Dafür betrachtet er beispielhaft die beiden Schwerpunkte Nahrung – nachhaltige Fischerei und Aquakultur – sowie Energie aus dem Meer. Das Gutachten zeigt, dass ein nachhaltiger Umgang mit den Meeren dringend notwendig ist, dass eine Transformation zur klimaverträglichen, nachhaltigen Gesellschaft auch mit den Meeren möglich ist und dass sie weltweit erhebliche Vorteile für eine nachhaltige Energieversorgung sowie für die Ernährungssicherheit bringen kann.

Die Zusammenfassung sowie die Handlungs- und Forschungsempfehlungen finden Sie unter:

www.proclim.ch/News?2848

Quelle: Wissenschaftlicher Beirat der Bundesregierung
Globale Umweltveränderungen (WBGU)

Environmental change and migration in developing countries

a+ Fact Sheet

How do global environmental change and particularly climate change influence migration patterns in developing countries? This question is increasingly receiving attention up to the highest political levels. The present fact sheet summarises state-of-the-art scientific knowledge that can help to find answers, and it assesses how the issue affects Switzerland and its policies on migration, asylum, and development cooperation. Most studies' findings suggest that Switzerland will not be flooded with masses of environmental refugees. Population movements that are triggered by climatic factors occur mainly across short distances – within states and, to a lesser degree, between neighbouring states. Switzerland's main challenge is to provide assistance in the countries and regions affected.



This project of the Swiss Academies of Arts and Sciences draws on findings from two expert workshops organised by two working groups of the Swiss Academy of Sciences (SCNAT): the Commission for Research Partnerships with Developing Countries (KFPE) and the Forum for Climate and Global Change, ProClim-.

This fact sheet is also available in French and German. Further information at:

www.proclim.ch/News?2867

Regionale Klimaszenarien für die Schweiz

Fachbericht MeteoSchweiz Nr. 243

Scénarios climatiques régionaux pour la Suisse

Rapport technique n° 243 MétéoSuisse



(deutsch) Das Klima ist stetig im Wandel. Anpassungen an die Klimaänderung sind in der Schweiz bereits heute erforderlich und werden in Zukunft immer wichtiger. Um gezielte Anpassungsmassnahmen zu ergreifen, sind klimatologische Grundlagen unerlässlich. Das Bundesamt für Meteorologie und Klimatologie MeteoSchweiz hat im Auftrag des Bundesamtes für Umwelt BAFU eine regionale Übersicht verschiedener Klimaszenarien bis zur Mitte dieses Jahrhunderts erstellt. So ist in der Schweiz unter anderem mit einer deutlichen Zunahme der Anzahl Sommertage sowie einer Verlängerung der Vegetationsperiode zu rechnen. Auch die Wetterextreme werden von diesen Änderungen betroffen sein. Die Klimatologen erwarten beispielsweise häufigere Hitzewellen und längere Trockenperioden. Weitere Informationen unter: www.proclim.ch/News?2825

Quelle: Medienmitteilung MeteoSchweiz

(français) Le climat est en évolution constante. Les adaptations aux changements climatiques sont d'ores et déjà nécessaires en Suisse et deviendront de plus en plus cruciales à l'avenir. Pour pouvoir prendre des mesures d'adaptation ciblées, il est

nécessaire de disposer de bases climatologiques. À la demande de l'Office fédéral de l'environnement OFEV, l'Office fédéral de météorologie et de climatologie MétéoSuisse a établi un aperçu régional des différents scénarios climatiques possibles jusqu'au milieu du siècle. La Suisse devrait, par exemple, connaître une hausse sensible du nombre de jours d'été, ainsi qu'une prolongation de la période de végétation. Les événements météorologiques extrêmes seront également concernés par ces changements. Les climatologues s'attendent ainsi à des vagues de chaleur plus fréquentes et à des périodes de sécheresse plus longues. Plus d'informations sur:

www.proclim.ch/News?2826

Source: Communiqué aux médias MétéoSuisse

Klimaänderung in der Schweiz

Indikatoren zu Ursachen, Auswirkungen, Massnahmen

Changements climatiques en Suisse

Indicateurs des causes, des effets et des mesures

(deutsch) Das Klima der Erde verändert sich, und die Schweiz ist davon besonders betroffen. Das bezeugen diverse Umweltindikatoren, die mit der Klimaerwärmung in Verbindung gebracht werden. Dieser Bericht illustriert anhand einiger ausgewählter Beispiele die Klimaentwicklung sowie deren Auswirkungen auf die Kryosphäre, die Hydrosphäre, die Vegetation, die Gesundheit, die Wirtschaft und die Gesellschaft.

Weitere Informationen finden Sie unter:

www.proclim.ch/News?2768

Quelle: Bundesamt für Umwelt (BAFU); Bundesamt für Meteorologie und Klimatologie (MeteoSchweiz)

(français) Le climat de la Terre se modifie et la Suisse est particulièrement touchée, c'est ce qu'attestent différents indicateurs environnementaux mis en lien avec le réchauffement climatique. Ce rapport illustre ainsi à l'aide de quelques exemples choisis l'évolution du climat et ses impacts sur la cryosphère, l'hydrosphère, la végétation, la santé, l'économie ou la société.

Plus d'informations sur:

www.proclim.ch/News?2769

Source: Office fédéral de l'environnement (OFEV); Office fédéral de météorologie et de climatologie (MétéoSuisse)

Stickstoffflüsse in der Schweiz 2020

Reduktionsziele werden nicht erreicht

In dieser Studie wurde berechnet, wie gross die umweltrelevanten Stickstoffflüsse im Jahr 2020 sein werden unter Berücksichtigung bereits eingeleiteter oder beschlossener Massnahmen und weiterer Zukunftsszenarien. In einem Basisszenario wurde die Entwicklung der Stickstoffflüsse auf Grundlage vorhandener Sektor-Szenarien, Literaturrecherchen und Experteneinschätzungen modelliert.

Zusätzlich zu diesem Basisszenario wurden drei Wenn-Dann Analysen betrachtet. Dazu gehören die neu ausgerichtete Energiestrategie 2050, die vollständige Umsetzung von Massnahmen des Luftreinhalte-Konzepts des Bundesrats sowie ein Massnahmenpaket zur Reduktion der Stickstoffverluste aus der Landwirtschaft durch Anwendung von den besten verfügbaren Techniken.

Aus dem Basisszenario wird ersichtlich, dass bis 2020 noch keines der national und international verbindlichen Reduktionsziele erreicht werden kann. Während der Stickstoffausstoss im Bereich Verkehr noch deutlich abnehmen wird, bleiben die Emissionen der Landwirtschaft knapp auf dem heutigen Niveau. In diesem Sektor ist das Potenzial zur Reduktion am grössten.

Link für Download: www.proclim.ch/News?2795

Quelle: BAFU

Schweizer Waldpolitik 2020

Visionen, Ziele und Massnahmen für eine nachhaltige Bewirtschaftung des Schweizer Waldes

Politique forestière 2020

Visions, objectifs et mesures pour une gestion durable des forêts suisses

(deutsch) Die Waldpolitik 2020 löst das bisherige Waldprogramm Schweiz ab. Neu sind die Zielsetzungen im Bereich Klimawandel. So sollen der Wald und die Waldbewirtschaftung zur Minderung der Klimaänderung beitragen, indem der nachwachsende Rohstoff Holz vermehrt genutzt und optimal verwendet wird. Damit kann die CO₂-Bilanz der Schweiz verbessert und ein grösserer Beitrag zur Versorgung mit erneuerbarer Energie geleistet werden. Daneben soll der Wald als anpassungsfähiges Ökosystem erhalten bleiben, damit er die vielfältigen Leistungen auch



Ziel der Waldpolitik ist es, dass die Waldbewirtschaftung und die Holzverwendung zu einer möglichst hohen CO₂-Reduktion beitragen.

unter sich ändernden klimatischen Bedingungen erbringen kann.

Die Waldpolitik 2020 des Bundes legt insgesamt elf Ziele fest. Für die nächsten knapp zehn Jahre legt der Bund den Schwerpunkt auf folgende fünf Ziele:

- Das Potenzial nachhaltig nutzbaren Holzes wird ausgeschöpft
- Klimawandel: Minderung und Anpassung ist sichergestellt
- Die Schutzwaldleistung ist gesichert
- Die Biodiversität bleibt erhalten und ist gezielt verbessert
- Die Waldfläche bleibt erhalten

Der Bericht kann unter www.proclim.ch/News?2744 heruntergeladen werden.

Quelle: BAFU

(français) La Politique forestière 2020 fait suite au Programme forestier suisse. Elle fixe aussi désormais des objectifs en matière climatique. La forêt et la gestion forestière doivent contribuer à atténuer les changements climatiques en exploitant plus et mieux la matière première renouvelable bois. C'est un moyen d'améliorer le bilan de CO₂ de la Suisse et d'apporter une contribution importante à l'approvisionnement en énergie renouvelable. En outre, la forêt doit être préservée en tant qu'écosystème capable d'adaptation, afin qu'elle puisse, même dans des conditions climatiques changeantes, fournir ses multiples prestations. La Politique forestière 2020 de la Confédération fixe au total onze objectifs. Cinq d'entre eux

constituent les points essentiels sur lesquels la Confédération veut se concentrer au cours des dix prochaines années:

- Le potentiel d'exploitation durable du bois est mis à profit
- Changements climatiques: la mitigation et l'adaptation sont assurées
- La fonction protectrice de la forêt est assurée
- La biodiversité est préservée et améliorée de façon ciblée
- La surface forestière est conservée

Télécharger le rapport sur: www.proclim.ch/News?2753

Source: OFEV

Assessment Report on Soil Information

A new report from the Food and Agriculture Organization of the UN (FAO) and the Global Soil Partnership (GSP) reviews the availability of soil information, user needs and state of the art methods and tools for soil mapping. Soil information becomes fundamental to guide policies and decisions under the current challenges of climate change adaptation and mitigation, further provision of ecosystem services and sustainable agriculture.

The report examines the global data sets that have been developed to map soils, as well as commonly used indicators, and reviews regional and national variability in the quality and availability of data. It also highlights the need for soil information dissemination to potential users and identifies current initiatives in the discipline. The publication recommends linking digital soil mapping to field studies and calls for a multi-scale/multi-resolution approach targeting potential users.

The publication also stresses the need for the soil science community to join together in the development of a common voice on the use of soil data and information sharing systems.

You can download the publication «State of the Art Report on Global and Regional Information» at: www.proclim.ch/news?2821

Source: FAO 2013

Every breath we take

Improving air quality in Europe



As a result of an ever-growing body of scientific evidence, demands by the public and a series of legislation, Europe's air quality has improved considerably in the last 60 years. The concentrations of many air pollutants have decreased significantly. Lead concentrations have dropped sharply below the limits set by legislation. But despite such achievements, Europe has not yet attained the air quality foreseen in its legislation or desired by its citizens.

Science shows that even very small improvements in air quality result in health gains as well as economic savings. These benefits include: higher quality of life for citizens who suffer less from pollution-related diseases; higher productivity due to fewer sick days; and lower medical costs for society. Science also tells us that taking action on air pollution can have secondary benefits. For example, some greenhouse gases are also common air pollutants.

The challenge of how to continue translating our growing understanding of the air into better policy and health outcomes has to be faced. What are the actions to reduce air pollution's impact on our health and the environment? What are the best options available? It is exactly at moments like these that the scientist, the policymaker and the citizen need to work hand-in-hand to address these questions and so to improve air quality in Europe.

Download at: www.proclim.ch/News?2774

Source: European Environment Agency (EEA)

Adaptation in Europe

European Environment Agency EEA Report No 3/2013



This report provides policymakers across Europe, at different levels of governance and stages of policy formulation, with information that can be used to support adaptation planning and implementation. Specific parts of the report are therefore targeted at different audiences.

It draws on the experience of existing adaptation strategies and actions, promotes better informed decision-making in key vulnerable sectors and improved resilience across the EU. It supports the implementation of the EU Strategy on Adaptation to Climate Change. You can download the report at: www.proclim.ch/news?2813

Source: European Environment Agency EEA

Achieving energy efficiency through behaviour change: what does it take?

EEA European Environment Agency No 5/2013

This EEA report reviews recent studies on behaviour change and energy use. It shows that up to 20 % of the energy we currently consume can be saved through changing behaviour.

It focuses on Energy efficiency measures and behaviour change as well as structural factors. A certain rebound effect might occur when implementing energy efficiency policies but it is unlikely to be sufficiently high to outweigh the benefits of these policies. In addition, energy efficiency policies have multiple benefits in terms of employment, health and competitiveness that should be considered as well. You can download of the report at: www.proclim.ch/News?2793

Meeting reports

14th Swiss Global Change Day

Audience and speakers from all over the world

On 16th April 2013 the Swiss global change research community met for the 14th time at the Swiss Global Change Day in Bern. About 250 participants attended the event and almost 80 posters were presented, giving an overview of global change research activities in Switzerland.

Heinz Gutscher, chair of the ProClim steering committee, welcomed the audience, and in particular the participants from IGBP who took the chance to attend the Swiss Global Change Day, since the IGBP meeting took place the same week in Bern.

Sybil P. Seitzinger, Executive Director of IGBP, briefly introduced IGBP and its core projects. She emphasized the importance of Swiss scientists within IGBP. Seitzinger also encouraged young researchers to get involved with IGBP and pointed to the websites of IGBP and the core projects, the newsletters, conferences, workshops and summer schools. Seitzinger finished by raising awareness for Future Earth, which will become the common roof of IGBP, IHDP and DIVERSITAS by 2014.

James P.M. Syvitski from the University of Colorado, US, focused on sea level rise and the importance of the climate signal in comparison to human-induced coastal subsidence. He emphasized that global sea level rise is an average value, often of little concern for the people living along the coast. At a particular coast, relative effects are usually dominant. Thus, the impact of deltas or fish farms, for instance, may be far more important than global effects. Syvitski concluded by estimating the contribution of the climate signal to regional sea level rise to just about 10 per cent so far. However, climate change impacts might become much more important if storm surge frequency or river flooding were to increase.

Patricia A. Matrai from the Bigelow Laboratory for Ocean Sciences, US, talked about primary production in the Arctic Ocean. She focused on the influence of environmental change on primary producers. One important factor is light, which will increase due to ice loss. However, primary production is not a simple function of light, but increases with more light up to a certain point and then decreases again. Furthermore, ice melt and surface warming also mean a more stable stratification, resulting in low nutrient supply

(as another growth limiting factor) to the surface. All in all, the mechanisms are very complex and there will be contrasting changes, meaning e.g. gains and losses for different regional fish industries.

Stefanie Hellweg from ETH Zurich introduced first results of studies about consumption and the environment. In particular, she focused on Life Cycle Assessment of consumption patterns. With regard to climate change, housing, nutrition, and mobility are the most important consumption areas in Switzerland. They account for two thirds of climate change impact. Hellweg pointed out that changing people's habits would not be easy. Furthermore, minimizing environmental impacts requires considering various other impacts apart from climate change, such as, for instance, ozone depletion, eutrophication or land stress.

Konrad Steffen, Director of WSL, looked at the dynamics of the Greenland ice sheet as a result of global warming. Due to the impact of climate change, the surface mass balance has been negative since 1996. Furthermore, ice sheet melt area has increased by 65 per cent since 1979. The acceleration of melting gives rise to the question whether the negative trend will continue to accelerate. Steffen suggests that the mass loss of Greenland will slow down once the outlet glaciers lose contact to the sea (no more calving) and melting will become the dominant ablation process. However, up to now, there is no model available that fully represents the dynamics of the ice sheet.

Raymond S. Bradley from the Climate Research Center, US, focused on abrupt climate change and its triggers. He looked at abrupt changes in the past related to the 8.2 ky event, to Dansgaard-Oeschger and Heinrich events. These abrupt climate changes coincided with a weakening of the Atlantic Meridional Overturning Circulation (AMOC) caused by a rapid freshwater discharge originating either from the melting of ice sheets in the northern hemisphere, or as a new hypothesis, originating from a freshwater input related to a rapid disintegration of the arctic sea ice and the superimposed snow/ice cover. However, the exact mechanisms are not yet fully understood and require further research.

Vittorio Loreto from the Sapienza University of Rome gave an insight on the complexity of envi-



This year's surprise were the two musicians Alexandre Cellier (on the left) and Ion Miu playing its Cymbalum. Photo: C. Ritz

ronmental awareness and learning. By means of various examples he showed how people could get involved into science and research-related tasks. Loreto suggested that turning citizens into «sensors» might be a first step to raising environmental awareness. According to him, involving people in research by encouraging them to gather data enhances their awareness and learning and may eventually lead to behavioral changes. However, there is still a long way to go.

In the poster session the best posters in the fields of WCRP and IGBP were selected by a jury and honored with a travel award of 1000 Swiss francs each. Since the participation in the fields of IHDP and DIVERSITAS was very low, no prizes could be awarded. Hopefully, there will be more posters handed in next year. The following posters were awarded:

WCRP (awards were sponsored by the ACP, the Commission for Atmospheric Chemistry and Physics, SCNAT):

- Elisavet Proedrou: Investigating the Effects of Meteors on the Atmosphere
- Suzanne Visser: Highly time- and size-resolved measurements of trace elements in London during ClearfLo

IGBP (awards were sponsored by the Swiss IGBP Committee, SCNAT):

- Christoph Butz: Hyper-spectral imaging of lake sediments
- Jan Paul Krüger: Palsa degradation changes stable carbon isotope depth profiles

You can download all presentations and posters at: www.proclim.ch/News22789

28th IGBP Science Committee Meeting held in Bern

From the start to the transition to Future Earth

The 28th Science Committee Meeting of the International Geosphere and Biosphere Program (IGBP) was held in Bern from 17–19 April 2013. Bern plays a symbolic role for IGBP, since IGBP was founded in Bern in 1986. This year's meeting was marked by the transition to «Future Earth». IGBP will stop its operation at the end of 2015.

The meeting was launched on Monday, April 15 by a welcome address from the rector of the University of Bern, Prof. Martin Täuber, and by the president of the Swiss Scientific Academies, Prof. Thierry Courvoisier. A delegation of the IGBP Steering Committee then met with science funding, policy and networking agencies. During the apéro in the ice labor of the university's climate physics group, Kathy Riklin, President of the Advisory Body on Climate Change (Occc) and Vice Chair of the parliamentary group on Climate Change, stressed the importance of profound international cooperation, which is espe-

cially important for a small country such as Switzerland. As parliamentarian she very much welcomes the dialog with the science community.

This year's Swiss Global Change Day was imbedded into the IGBP program and offered the opportunity to learn more about IGBP and its scientific highlights.

The excursion to the top of the Schilthorn mountain on Saturday offered a great surprise, as the participants penetrated the clouds and had a beautiful view on the high mountains and on a fog bank covering the lower parts of Switzerland.

The meeting was hosted by ProClim, PAGES, the Oeschger Centre for Climate Change Research (OCCR) and the Center for Climate Systems Modelling (C2SM). The meeting and especially the side events were only possible thanks to the generous support by the Swiss National Science Foundation (SNF), the Swiss Agency for Development and Cooperation (SDC) and the State Secretariat for Education, Research and Innovation (SERI).



Impressions from the IGBP Meeting in Bern. Photo: C. Ritz

Future Earth regional workshop for Europe in May 2013 in Paris

The Future Earth workshop for Europe in May 2013 in Paris discussed the regional needs and requirements. It was stressed that substantial regional differences worldwide and in Europe require regional dialogs with stakeholders and that co-production of projects must respect the cultural and institutional differences. To have the foreseen impact the Future Earth program strongly depends on regional and national nodes.



Participants of the Europe Regional Workshop held in Paris on 13–14 May 2013.

Suggested main activities of a Future Earth European node are:

- Integrate and disseminate knowledge to regional scientific and other stakeholder communities
- Engage regional stakeholders and support ongoing multi-stakeholder dialogues, co-design of research initiative and co-production of knowledge (match making function)
- Build regional capacity especially for young people and early-career scientists, and support education for sustainability at all educational levels
- Support the coordination of regional Future Earth activities with other regions, and at global level
- Map the research landscape in key domains such as climate, biodiversity and act as incubator of new projects
- Strengthen institutional capacity on a national level

Further reading about the Future Earth Program at: www.proclim.ch/news?2824

Wie hoch sind die volkswirtschaftlichen Kosten der Energiestrategie 2050?

58. Treffen der Parlamentarischen Gruppe «Klimaänderung» vom 13. März 2013

Die Energiestrategie 2050 erfüllt, wenn sie umgesetzt ist, die Schweizer Verpflichtung zur Stabilisierung der Klimaänderung. Sie reduziert die Auslandabhängigkeit im Energiebereich und eliminiert die Risiken durch Kernkraftwerke. Welches sind die Kosten und der Nutzen der vorgeschlagenen Massnahmen? Die Meinungen dazu gehen weit auseinander und werden in den Medien kontrovers diskutiert.

Philippe Thalmann analysiert, warum verschiedene Modelle durch ihren Ansatz oder aufgrund unterschiedlicher Annahmen zu verschiedenen Resultaten kommen. Alle zehn betrachteten Studien zeigen, dass die Schweiz ihren Verbrauch fossiler Energie massiv verringern kann mit einem BIP-Verlust im Bereich von 0–1 % pro Jahr. Nicht berücksichtigt darin sind weitere Nebenleistungen wie intaktere Umwelt, weniger Auslandsabhängigkeit bei den Fossilen, weniger ungedeckte Risiken bei den Erneuerbaren.

Lucas Bretschger stellt am Treffen die Resultate eines modernen dynamischen Modells vor und zeigt auf, wie sensibel die Resultate auf unterschiedliche Annahmen reagieren:

- Die Konsumententwicklung wird durch Variation der Annahmen in plausiblen Bandbreiten zwar beeinflusst, aber nicht dominiert.
- Im internationalen Vergleich wachsen Länder mit hohem Energieverbrauch nicht rascher als solche mit einem niedrigen Verbrauch.
- «What's Good for General Motors – is Good for America» ist kein geeigneter Grundsatz, um einen Strukturwandel frühzeitig einzuleiten.

CCES News 10

Scientific Events

Save the date: CCES 2014 Conference 'Research, Education, and Dialogue for Environment and Sustainability – Achievements and Challenges', February 26, 2014

Analyzing and understanding the complex causes, mechanisms and extent of past, current and future environmental change and its impacts on sustainability from a scientific as well as a societal perspective is the goal of CCES. Since its implementation in 2006, this goal has been pursued within the scope of 25 large interdisciplinary and inter-institutional research collaborations. Furthermore, CCES has realized a number of initiatives to foster the dialogue on sustainability issues and the dissemination and adoption of sustainability know-how

with various stakeholders outside science. The CCES 2014 Conference 'Research, Education, and Dialogue for Environment and Sustainability – Achievements and Challenges' taking place at ETH Zurich on Wednesday, February 26, 2014 will provide the platform for the presentation and discussion of CCES research highlights and dialogue activities of the past three years. Save the date now!

Contact: info@cces.ethz.ch, phone 044 632 85 37

Conference information: www.cces.ethz.ch/conference2014

Education

Apply now for the CCES Winter School 2014 'Science Meets Practice'

The impressions of the Winter School participants 2013 were again vast and the learning processes deep and enriching: Group dynamics of exceptionally high quality, intellectually stimulating, challenging because of diverse cultural and disciplinary backgrounds of the participants, enhanced competence in dealing with multiple conceptions and perspectives for making interactions between science and practice happen. As one of the participants mentioned in the final feedback round: «I feel very much encouraged that other people are reflecting about these topics in the whole world and also in different generations, but in the end now I feel a little bit sad to go back into the system we've represented before.» The CCES Winter School not only dedicates room for reflection on scientific activities and interactions with society but also shows ways to deal with the challenges at the science-practice interfaces. «We all had that interest before for what science should be within society and how it should engage with practice. But now I don't feel alone anymore in that quest.» You can also become part



Stakeholder workshop on the opportunities, challenges, and implementation of the energy transition on a community level during the third CCES Winter School 2013. Photo: C. Zingerli, CCES.

of this: The call for applications for the CCES Winter School 2014 is open now. Flyer, online application form, and further information are available at www.cces.ethz.ch/winterschool.

CCES Winter School 2014, 'Propstei Wislikofen', January 6 to 9 and February 3 to 6, 2014. Application deadline is September 30, 2013.

Contact: Claudia Zingerli, CCES, claudia.zingerli@usys.ethz.ch, phone: 044 633 92 75, or Michael Stauffacher, ETH Zurich, michael.stauffacher@env.ethz.ch, phone: 044 632 49 07

ETH students studied the successful restoration of the river Thur

Over the last decades, more and more waters have been revitalized to restore their natural functions and to improve flood protection. In the context of the CCES RECORD Catchment project, 16 ETH students from the Master program Human-Environment Systems studied the river restoration of the Thur in Niederneunforn/TG (www.uns.ethz.ch/translab/cs_former/2012). The results show that the river restoration project can be considered a success, both from an ecological and public perspective. Some concerns were, however, expressed about the transparency of the financial information available to the public. Results and project progress were presented twice to a stakeholder group with representatives from the municipalities of Neunforn, Thalheim, Altikon and the canton of Thurgovia. These two events were also communicated in the local newspaper «Andelfinger Zeitung». To conclude the study, a booklet for the



Students discussing their results with stakeholders. Photo: TdLab, ETH Zurich

public with the main results has just been published (see www.uns.ethz.ch/pub/tdpub/csbooks/CS_2012_Broschuere_V03_Web.pdf).

Andreas Rösch and Michael Stauffacher, ETH Zurich

Contact: michael.stauffacher@env.ethz.ch

This activity makes part of the CCES RECORD Catchment project: www.cces.ethz.ch/projects/nature/Record

Outreach

Insights into rapid mass movements at Scientifica 2013

The CCES project TRAMM – Triggering of Rapid Mass Movements in Steep Terrain – will demonstrate new tools for the early warning of landslides, snow avalanches and debris flows at ‘Scientifica 2013’, the annual public exhibition of ETH Zurich and the University of Zurich, taking place from August 30 to September 1, 2013. This year, the overarching topic of ‘Scientifica’ is «risk» (www.scientifica.ch). TRAMM will both highlight the risks for people and infrastructure resulting from rapid mass movements and show

new innovations that may mitigate these risks in the future. In a virtual landscape, visitors will have a chance to discover where shallow landslides form and how far they travel before they stop. In addition, they will experience how the sound of a collapsing sample of soil or snow can be used to predict imminent hazards.

Manfred Stähli, WSL, Birmensdorf

Contact: manfred.staehli@wsl.ch

This activity will be organized by the TRAMM project: www.cces.ethz.ch/projects/hazri/tramm

Research

Taking stock of Switzerland’s methane emissions

The CCES project MAIOLICA investigated land-surface interactions and their effect on greenhouse gas fluxes, and generated a wealth of experimental data for terrestrial and lake ecosystems with a particular focus on fluxes of methane (CH₄). For a complete accounting of human-made and natural CH₄ sources on a national level, these observations need to be upscaled with geostatistical information on the distribution and activity of individual sources. Such a task is performed routinely by the Swiss Federal Office for the Environment (FOEN) for the annual National Inventory Report (NIR,

FOEN 2013) of Switzerland’s greenhouse gas emissions. However, the NIR only considers anthropogenic CH₄ emissions but no natural sources and sinks. The main goal of MAIOLICA Synthesis was thus to develop a complete methane budget for Switzerland by combining information from the NIR, MAIOLICA, and other research projects. A major outcome of this work is a detailed, spatially explicit inventory of anthropogenic and natural methane fluxes (Figure 1a). Already in the framework of MAIOLICA, an inventory of anthropogenic emissions had been developed by the

company Meteotest for the year 2007. This inventory has now been updated for 2011 and extended with new layers representing CH₄ emissions from wastewater treatment and natural sources and sinks (Figure 1b). Globally, natural emissions from wetlands, oceans, wild animals and biomass burning contribute more than one third to the total emissions and are thought to be the main drivers of the observed large interannual variability of atmospheric CH₄. In Switzerland, however, most wetlands were drained and emissions from wild animals are almost negligible as compared to emissions from cattle. Hence, natural emissions are estimated to contribute only 3 % to the Swiss total even if semi-natural emissions from hydroelectric res-

ervoirs are included. The agricultural sector with its emissions from ruminants and manure management is by far the largest CH₄ source (>80 %), followed by landfills (8 %) and the distribution of natural gas (7 %). The gridded inventory will be of particular value for atmospheric modeling studies of regional CH₄ sources and has already proven its value for the interpretation of airborne and ground-based CH₄ observations over Switzerland.

Dominik Brunner and Rebecca Hiller, Empa, Duebendorf;
Nina Buchmann, ETH Zurich
Contact: dominik.brunner@empa.ch
This study makes part of the MAIOLICA project:
www.cces.ethz.ch/projects/clench/maiolica

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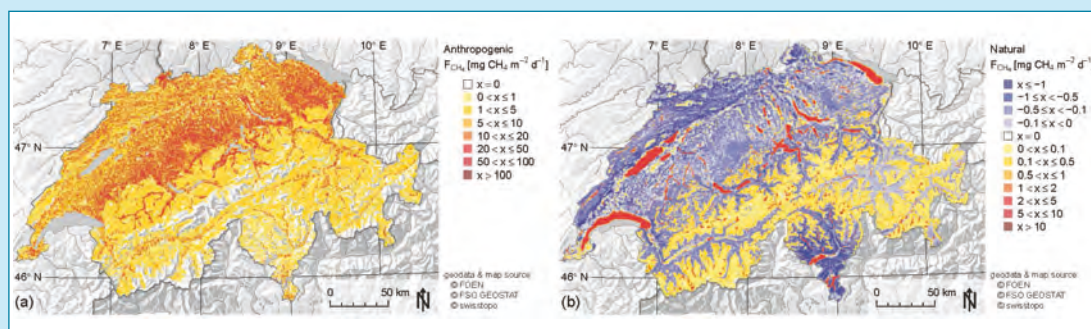


Figure 1: Swiss CH₄ fluxes from (a) anthropogenic (agriculture, energy, waste) and (b) natural contributors (wetlands, lakes and reservoirs, wild animals, forest uptake). Note the ten times smaller scale for natural fluxes. Sources: background map: ©swisstopo; geostatistical data: ©Swiss Federal Office for the Environment (FOEN), and ©Swiss Federal Statistical Office (SFSO), GEOSTAT.

Genetic diversity along altitudinal gradients may facilitate response to environmental change

Genetic diversity is an important prerequisite for the species' ability to respond to environmental change, for instance in the course of global warming. We surveyed the scientific literature to investigate whether animal populations are genetically adapted to different environments along altitudinal gradients, which can serve as spatial surrogates for some of the temporal changes expected under global warming. Based on about 100 publications, we found that genetically-based phenotypic differences between popu-

lations from different altitudes are common and taxonomically widespread, involving traits such as mass, wing size, tolerance to thermal extremes and melanization. Evidence for a role in altitudinal adaptation also exists for a number of anonymous molecular loci and candidate genes, most prominently hemoglobin. These results suggest that populations from different altitudinal environments may harbor substantial genetic variation. This diversity may facilitate the response of species to environmental change.

Irene Keller, Eawag Kastanienbaum, Rolf Holderegger, WSL Birmensdorf, Jake Alexander and Peter Edwards, ETH Zurich
Contact: Irene.Keller@eawag.ch

This research is a result of a CCES synthesis project jointly accomplished by the CCES projects ENHANCE, www.cces.ethz.ch/projects/sulu/ENHANCE, and BioChange, www.cces.ethz.ch/projects/clench/BioChange

Reference

Keller, I., Alexander, J.M., Holderegger, R. & Edwards P.J. Widespread phenotypic and genetic divergence along altitudinal gradients in animals. Submitted manuscript, available from I. Keller upon request.

OCCR Flash – News from the Oeschger Centre

The Oeschger Centre has strengthened its structure over the last months. A new ^{14}C -AMS laboratory has started operations and a «Mobiliar lab for climate risks and natural hazards» will be established.

New radiocarbon dating system inaugurated

A new 1.8 million franc ^{14}C laboratory initiated by the OCCR was inaugurated on 3 May 2013 with a scientific symposium. The event was attended by 140 participants interested in the possibilities offered by the new accelerator mass spectrometer known as MICADAS (Mini radioCARbon DAting System). The new laboratory is open not only to researchers attached to the Oeschger Centre, but also to any other interested party. «This project is a prime example of the way in which the Oeschger Centre can pool strengths, exploit synergies and implement major projects,» OCCR director Martin Grosjean said at the ceremony. The facility allows for very small samples to be analysed and thus opens up new opportunities in climate and environmental research. (www.14c.unibe.ch)



Guests at the formal ceremony inauguration of MICADAS marvel at the new facility.

Mobiliar Lab for climate risks and natural hazards

The Swiss Mobiliar cooperative insurance company has decided to substantially expand its existing collaboration with the Oeschger Centre. A «Mobiliar lab for climate risks and natural hazards» is to be established as part of the Mobiliar Chair for Climate Impact Research in the Alpine Region at the OCCR. The research conducted by the Mobiliar lab will concentrate on quantifying climate risks and natural hazards, particularly wind, hail, water and mass wasting with very high spatial resolution. The planned research projects will study the recent

past, the present and the next few decades. Extreme events from the last millennium, which are of great importance for the present and the future, will also be investigated. In conjunction with the Mobiliar Chair and other research groups both inside and outside the OCCR, the Mobiliar lab is to combine pure research, interdisciplinary practical research and implementation projects. Financing for the Mobiliar lab is initially secured until 2020. The lab will come into operation in autumn 2013.

A record audience at the «Tag für Hydrologie»

Over 300 researchers and practitioners met in Bern on 4–6 April 2013 for the 15th «Tag der Hydrologie». The annual meeting for hydrologists from Germany, Austria and Switzerland took place for the first time in its history in Switzerland and was co-sponsored and organised by the OCCR's Hydrology group. It caused more interest than ever, more than 100 different research projects were presented and some 30 presentations were held. The conference proceedings can be downloaded from

<http://chy.scnatweb.ch/d/Service/tdh13.php>.

NCCR Climate activities for young researchers to be continued

The Oeschger Centre has taken over the Young Researchers Meeting, which was originally initiated by the NCCR Climate, and opened it to all young climate researchers working in Switzerland. 35 PhD students and PostDocs met on 6 and 7 June 2013 for workshops on how to optimally market themselves. The Summer School, another trademark event of the NCCR Climate, will also continue beyond the closure of the research programme. It has been renamed Swiss Climate Summer School and is now jointly organised by the OCCR and the C2SM. The 2014 edition will be on «Impacts of Climate Change». (www.oeschger.unibe.ch -> education)

For an overview of OCCR activities and events see www.oeschger.unibe.ch

Contact: Kaspar Meuli meuli@oeschger.unibe.ch

C2SM News – June 2013

Nicolas Gruber new chair of C2SM

On March 1st, Christoph Schär stepped back as founding chair of C2SM and passed on the torch to Nicolas Gruber. During the past 5 years Christoph Schär shaped the Center to a leading research institution with strong ties to MeteoSwiss, Empa, Agroscope, CSCS and a number of partner institutions in Switzerland and abroad. One of the most visible products are the Swiss climate change scenarios CH2011. Taking over as chair, Nicolas Gruber plans to continue the expansion of C2SM and its consolidation as a premier institution in climate research. In particular, he plans to broaden the scope of C2SM to include a wider range of subjects, such as impact and energy related studies. He is also eager to strengthen C2SM's ties to the public and private sectors.

WSL joined the C2SM network



This spring, the Swiss Federal Institute for Forest, Snow and Landscape Research (WSL), joined C2SM as a new partner institution. New members from WSL include director Konrad Steffen – also as a new member of the Steering Committee – Niklaus Zimmermann, head of the research unit «Landscape Dynamics», and Michael Lehning, head of the research unit «Snow and Permafrost». «Joining C2SM is an important step to further improve our impact studies by using the most recent and up-to-date climate simulations and scenarios and to offer our expertise in climate impact assessment to C2SM», says Niklaus Zimmermann.

Science Highlights

Projections of extreme precipitations in Europe and the Alpine region

Heavy precipitation events bear the potential for severe societal, environmental and economical impacts. Particularly in regard of climate change, there is increasing interest in the future behavior of such high-impact events. For Europe and the Alpine region, Rajczak and colleagues have assessed projected changes in extreme precipitation events based on an ensemble of 10 regional climate models from the ENSEMBLES project. The study finds an intensification of heavy events across most of Europe and in all seasons, independent of projected changes in the frequency

and mean amount of precipitation. Most considerable changes were found in the Alps in fall. For instance, events with a current-day return period of 50 years across the northern Alps are expected to double in a future climate.

J. Rajczak, P. Pall, C. Schär (2013), J. Geophys. Res. Atmospheres, doi:10.1002/jgrd.50297

Energy budget constraints on climate response

The observed rate of global mean warming has been lower over the past decade than before. This has led to some debate about how sensitive climate is to the radiative forcing from greenhouse gases. Climate sensitivity is quantified by the Equilibrium Climate Sensitivity (ECS), which determines the eventual warming in response to stabilization of atmospheric composition on multi-century timescales, while the Transient Climate Response (TCR) determines the warming expected over a 50- to 100-year timescale following any steady increase in radiative forcing.

A group of researchers including Reto Knutti and Ulrike Lohmann have combined recent observed and modeled data to provide a more robust estimate of ECS and TCR. The new estimates are lower in the mean but remain consistent with previous results. These findings may indicate that some of the latest models used for the 5th IPCC assessment overestimate the expected future warming. This, however, does not mean that the global warming challenge has gone away as noted by Reto Knutti (see <http://blogs.ethz.ch/klimablog/2013/05/29/keine-entwarnung-beim-klimawandel>, in German). *Otto et al. (2013), Nature Geosciences, doi:10.1038/ngeo1836*

Upcoming event

«Klimarunde 2013: Welche Schlüsse ziehen wir aus dem UNO-Klimabericht 2013?» C2SM organizes a public event after the release of IPCC's 5th assessment report in September 2013. During the first part of the event the interested public has the opportunity to discuss face-to-face with climate experts involved in the IPCC process. Leading scientists and representatives from politics then present selected results and their implications and discuss the role of science in the climate change debate. Date and location: October 3rd, 2013 – ETH Zurich. Registration: www.c2sm.ethz.ch/Klimarunde2013

Contact: Isabelle Bey (isabelle.bey@env.ethz.ch)

Coupled human-environmental system on land

The Global Land Project (GLP) is an international research project focused on land systems. Human transformations of ecosystems and landscapes are the largest source of change on Earth. Intensification of land use and advances in technology have led to rapid changes in biogeochemical cycles, hydrologic processes and landscape dynamics. Changes in land use and management affect the states, properties and functions of ecosystems, which in turn, affect the provision of ecosystem services and hence human well-being. So links between decision making, ecosystem services and global environmental change define important pathways of feedback from coupled human-environment activities.

Focus on interactions of people, biota and natural resources

The goal of GLP is therefore to measure, model and understand the coupled human-environmental system. It is part of broader efforts to understand changes in the interaction between people and their environments, and the ways these affect the sustainability of the Earth System. For example changes in coupled human-environmental systems influence the cycling of energy, water, elements and biota at the global level, and global-level changes in political economy, such as international treaties and market liberalisation, affect decisions about resources at local and regional levels.

Understanding of these changes is enhanced when directed to the level of ecosystems and their synergy with human agents and societal structures, including the human consequences of biophysical changes. GLP therefore focuses on the interactions of the people, biota and natural resources of terrestrial and freshwater systems at local to regional scales. This research approach provides a framework to study the vulnerability and sustainability of the coupled system in different regions of the world.

Research Framework

Three objectives determine the research framework:

1. to identify the agents, structures and nature of change in coupled human-environment systems on land, and to quantify their effects on the coupled system;
2. to assess how the provision of ecosystem services is affected by the changes mentioned above;



3. to identify the character and dynamics of vulnerable and sustainable coupled human-environment systems to interacting perturbations, including climate change.

Three thematic areas emerge from these objectives:

- Dynamics of land system change
- Consequences of land system change
- Integrating analysis and modelling for land sustainability.

Getting involved

GLP will build on the research of more than a decade within IGBP and IHDP core projects, especially GCTE and LUCC. This legacy provides the opportunity to study the coupled human-environment system in ways not possible in the past. GLP seeks to merge these existing research communities, and to attract other researchers from the social and natural sciences and the humanities.

In Switzerland Dr. Andreas Heinimann working at the Centre for Development and Environment (CDE), Univ. of Bern, is member of the GLP Scientific Steering Committee. For more information you may contact him (andreas.heinimann@cde.unibe.ch) or Giovana Espindola (GLP project Executive Officer): giovana@dpi.inpe.br

Further information about this IHDP / IGBP core project can be found at:

www.globallandproject.org

Conferences and Events in Switzerland

8–12 July 2013

Davos Atmosphere and Cryosphere Assembly 2013 – Air, Ice & Process Interactions

Location: Davos Congress Centre

Info: www.daca13.org/index.html

19–23 August 2013

Environment and Health – Bridging South, North, East and West

Location: Congress Center Basel, Messeplatz

Info: www.ehbasel13.org

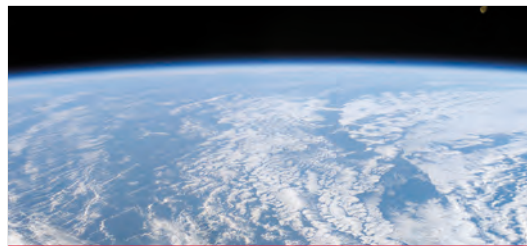
Registration: 31 July 2013

26–28 August 2013

Isotopes of Carbon, Water, and Geotracers in Paleoclimate Research

Location: University of Bern, Main Building, Hochschulstr. 4, 3012 Bern (rooms 220 and 215)

Info: www.oeschger.unibe.ch/events/conferences/isotopes/index_en.html



30. September 2013

IPCC Klimaänderung 2013 Wissenschaftliche Grundlagen

Einblicke in IPCC Climate Change 2013: The Physical Science Basis

Location: Hotel Bellevue Palace, Bern

www.proclim.ch/News?2742

30 August 2013

5. Symposium Anpassung an den Klimawandel: Regionale Herausforderungen

Location: UniS Bern

Info: www.occc.ch

17–20 September 2013

Changes in alpine and arctic flora under climate change 1st Conference: International Tundra Experiment ITEX

More than 20 years of tundra vegetation change research

Location: Kurhaus Bergün, GR

Info: www.wsl.ch/alpine-arctic-flora/itex/index_EN

Registration: 1 August 2013

22–25 September 2013

Changes in alpine and arctic flora under climate change 2nd Conference: Faster, Higher, More?

Past, Present and Future Dynamics of Alpine and Arctic Flora under Climate Change

Location: Kurhaus Bergün, GR

Info: www.wsl.ch/alpine-arctic-flora/gipfelflora/index_EN

Registration: 1 August 2013

1–3 September 2013

ClimTree 2013: International conference on climate change and tree responses in forests of Central Europe

Location: ETH Zurich

Info: www.climtree2013.org

16–19 September 2013

European IFA Academic Seminar

Participatory Foresight for Smarter Futures – From Design to Impact

Location: ZHAW, Winterthur / Zurich

Registration: 1 July 2013

26–27 September 2013

ScienceComm'13

Schweizer Jahreskongress der Wissenschaftskommunikation

Location: La Chaux-de-Fonds

Info: www.sciencecomm.ch/index.php

27 September 2013

Media training for researchers

Location: Maison de la Communication,
Lausanne (in French) | MAZ, Luzern (in German)
Info: www.snf.ch/E/services-for-researchers/researchers-communication/Pages/media-training.aspx

1 October 2013

AlpFUTUR Verbundprojekt: Schlusstagung

Location: Schüpfheim (LU)
Info: www.alpfutur.ch

6–9 October 2013

World Resources Forum

Location: Congress Center Davos
Info: www.worldresourcesforum.org/WRF-2013
Registration: 31 August 2013

11–12 October 2013

Probabilistic Modeling in Science and Philosophy

Location: University of Bern
Info: www.oeschger.unibe.ch/events/conferences/modeling
Registration: 31 August 2013

3 October 2013

Klimarunde 2013:

**Welche Schlüsse ziehen wir aus dem
UNO-Klimabericht 2013?**

Location: ETH Zurich

Info: www.c2sm.ethz.ch/Klimarunde2013

21 October 2013

Swiss Inter- and Transdisciplinarity Day 2013

Location: Theatersaal National, Hirschengraben 24,
Bern
Info: www.transdisciplinarity.ch/e/Award/SwissITD_Day2013.php
Registration: 15 June 2013

IGBP, IHDP, WCRP related Conferences

22–25 September 2013

Interdisciplinary Conference of Young Earth System Scientists

Location: University of Hamburg, Germany
Info: meetings.copernicus.org/icyess2013

15–18 October 2013

Africa Climate Conference

Location: Arusha International Conference
Centre (AICC), Arusha, Tanzania
Info: www.climdev-africa.org/acc2013

4–7 November 2013

International Conference on Regional Climate – CORDEX 2013

A partnership between WCRP, the European
Commission and IPCC
Location: European Commission, Charlemagne
Building, Brussels
Info: cordex2013.wcrp-climate.org/index.shtml
Registration: 20 August 2013

12–17 January 2014

SPARC (Stratospheric Processes and their Role in Climate) 2014 General Assembly

Location: Queenstown, New Zealand
Info: www.sparc2014.org

23–27 June 2014

IMBER Open Science Conference

Future Oceans
Location: Bergen, Norway
Info: www.imber.info/index.php/Meetings/IMBER-OSC-2014

Impressum

Published and distributed three times a year:

ProClim-, Forum for Climate and Global Change
Swiss Academy of Sciences (SCNAT)
Schwarztorstr. 9 | 3007 Bern | Switzerland

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Deadline for Contributions:

Flash No 58: 16 October 2013

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Circulation:

1500 | pdf version, distributed by e-mail
1200 | hard copy, printed by Druckzentrum
Vögel AG, Langnau, Switzerland

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Flash Newsletter, ProClim- News or Events Mail,
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