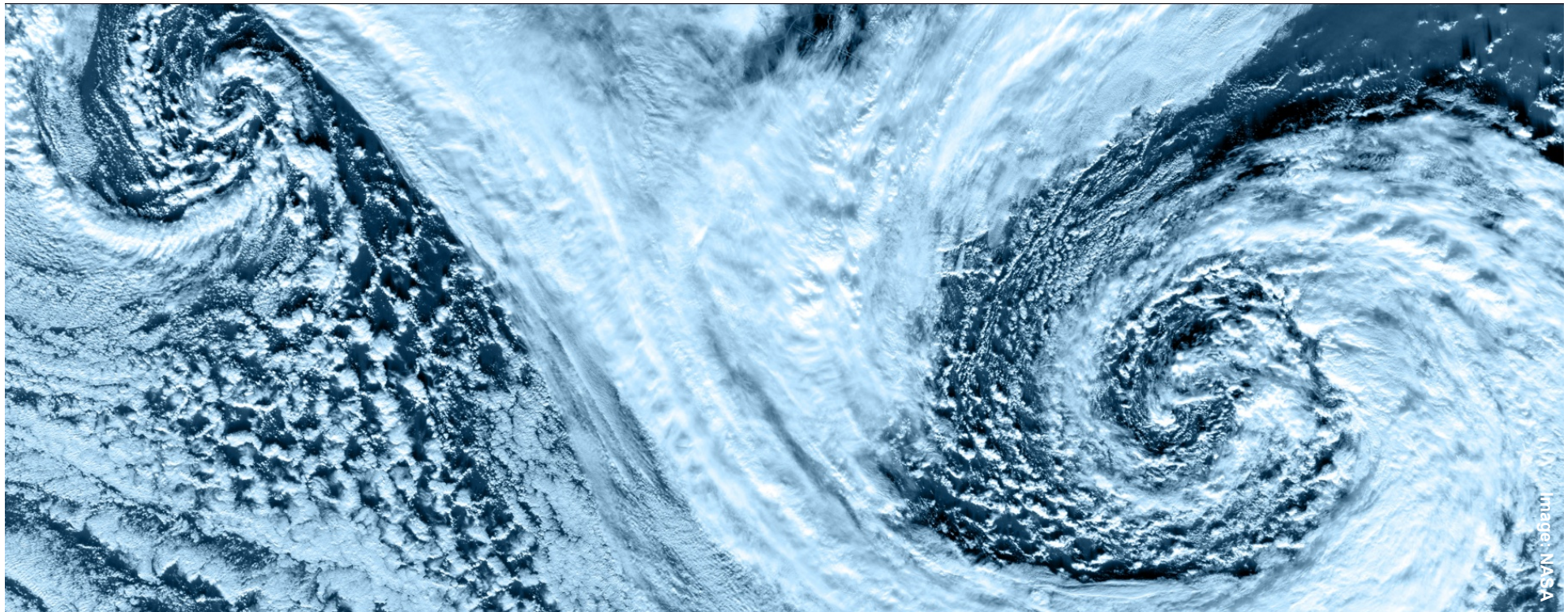# C2SM Community Day 2013: Welcome!

Isabelle Bey

Community Day − June 12, 2013

C2SM in brief (1/2)

- **A research center with a unifying research goal and theme**
  - Goal: Improve the understanding of our climate system, and our ability to predict it.
  - Research theme: "Multi-scale multi-component interactions in the climate system"
  - Focus on climate modeling and data analysis, and on neighboring research fields (e.g. climate impact sciences, computational sciences).

- **A networking platform**
  - Combines and exploits the expertise of 5 institutions: ETH, MeteoSwiss, Empa, WSL, Agroscope
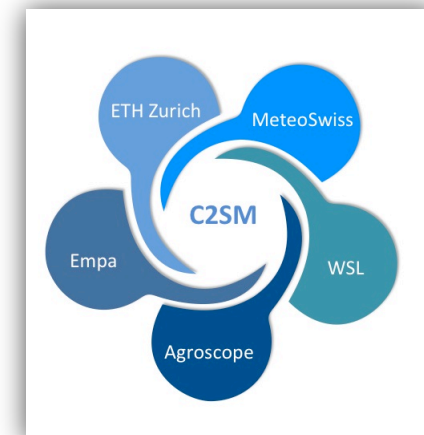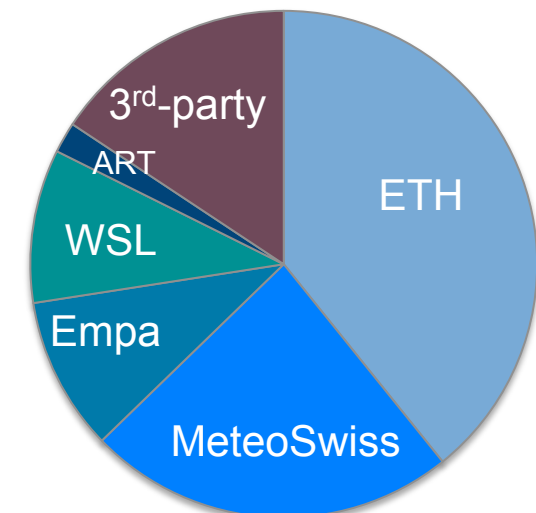
C2SM in brief (2/2)

- **A Community**

  - 26 Members from the 5 institutions
  - Over 250 scientists, students, etc.

- **Budget**

  - About 550 kCHF/year (80% from the partner institutions, 20% third-party)
  - Over 5.5 mCHF acquired in third-party funding since 2008 (ETH grants, NSF, HP2C, etc.)

Typical 1-year core funding
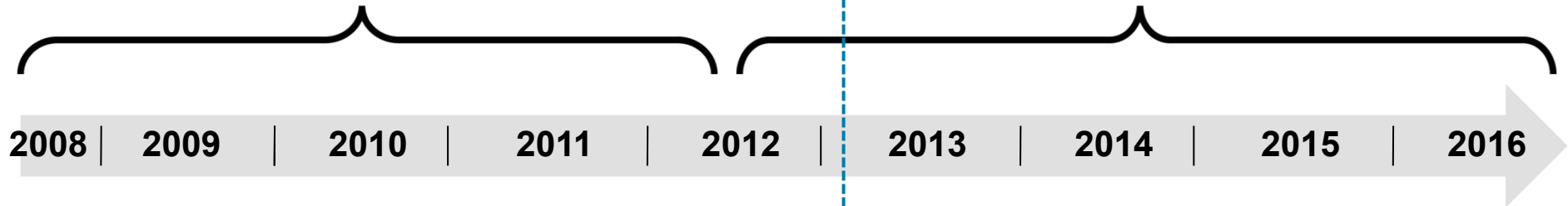
C2SM "history"

H Davis   C Schär

01.04.2013:
WSL joins as new member
New Steering Committee

Phase 1: July 2008 – June 2012
ETH-MeteoSwiss-Empa-Agroscope

Phase 2: July 2012 – Dec. 2016
ETH-MeteoSwiss-Empa-WSL-Agroscope

2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016

Steering Committee

C Schär   N Gruber

G Hauk   B Buchmann   U Lohmann   C Appenzeller

K Steffen

C2SM
Center for Climate
Systems Modeling
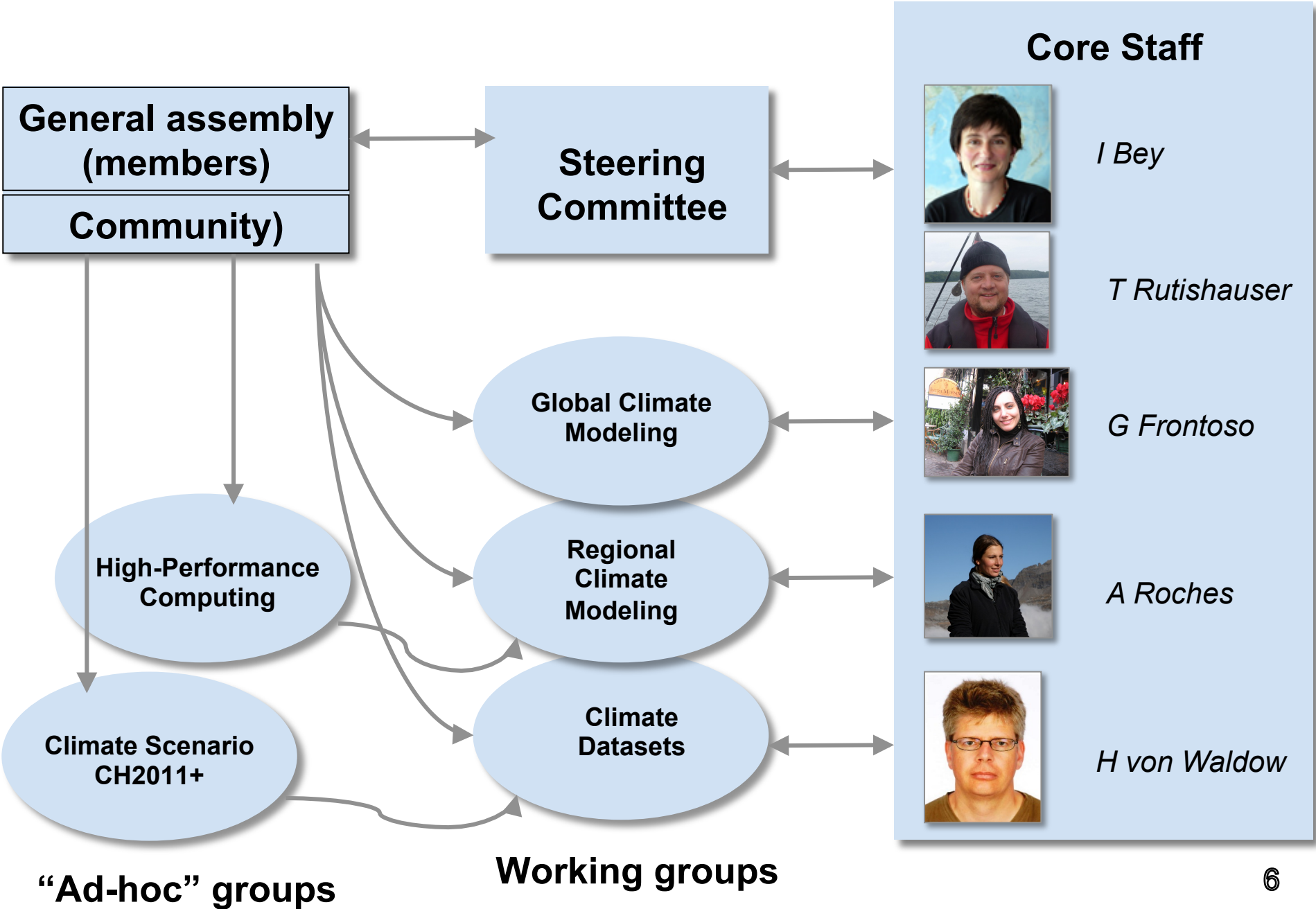
C2SM activities

- **Research coordination**
  - **Foster collaboration** between members and institutions.
  - Coordinate the development of **large, collaborative research projects**

- **Support for research and education activities**
  - **Maintain and improve two modeling systems**
  - Exploit and disseminate **key national and international data sets**
  - Prepare for the **next generation of high-performance computers**

- **Education**
  - Contribute towards an improved training of PhD students
 - Contribute to the organization of **summer school and M.Sc. programs**

- **Outreach**
  - **Increase awareness** about climate change
  - Facilitate the **dialog between scientists and private and public sectors**

C2SM "work flow"

General assembly (members)

Community)

Steering Committee

Global Climate Modeling

Regional Climate Modeling

High-Performance Computing

Climate Datasets

Climate Scenario CH2011+

"Ad-hoc" groups

Working groups

Core Staff

I Bey

T Rutishauser

G Frontoso

A Roches

H von Waldow
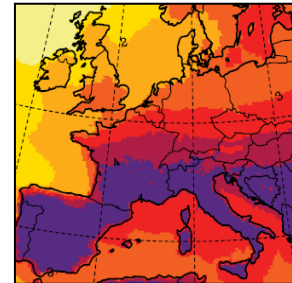
6

Main achievements since 2008

- **Common modeling families**

- **Collaborative scientific projects**

- **Climate Change Scenario for Switzerland CH2011**

- **High Performance Computing activities**
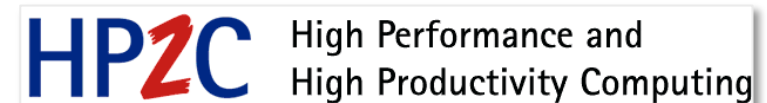
Common modeling families

- **Two modeling systems are maintained and refined**

The global
ECHAM
model

The regional
COSMO
model

- **In practice**:
- Development of cross-institutional source code management systems
- Implementation of new features in common modeling frameworks
- Development of joint facilities to support the analysis of model outputs

Modeling the water cycle in a changing climate – multi-scale interaction challenge

N Gruber

- **Large initiative funded by ETH (CHIRP2)**
  - PI: N. Gruber 1.5 mCHF 01.2012 – 12.2014
  - ETH, MeteoSwiss, Agroscope, C2SM

- **One common objective:**
  - Improve our understanding of the key processes driving the water cycle
  - Modeling strategy based on COSMO and ECHAM

- **Main Achievements**
  - E.g., implementation of coupled ocean-atmosphere capabilities around COSMO and ECHAM
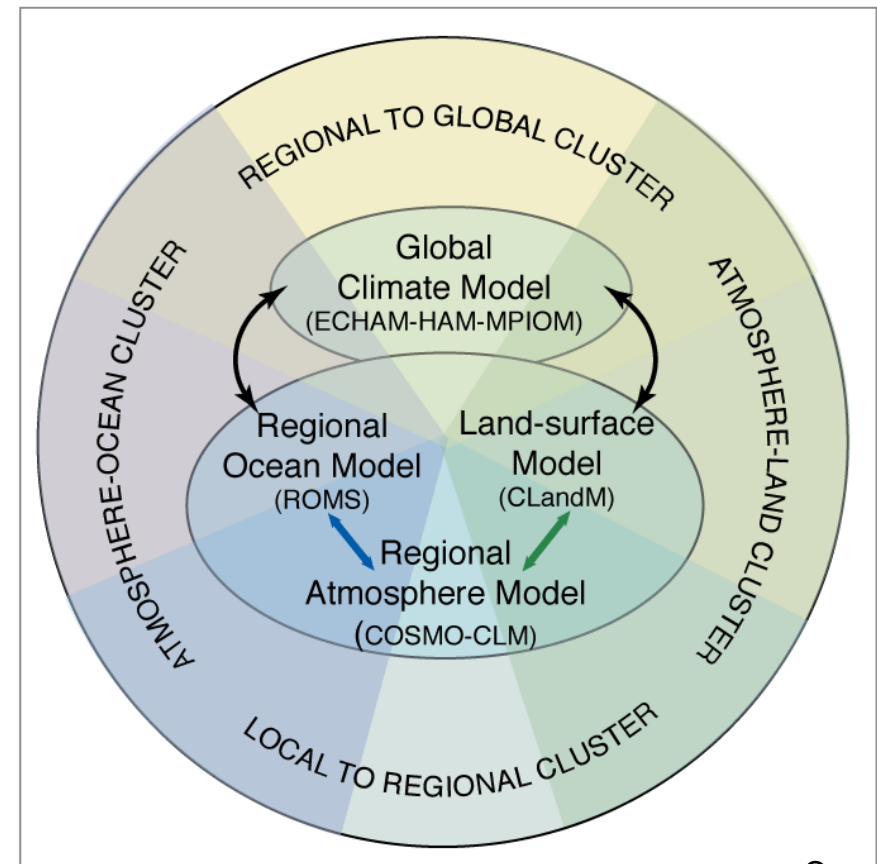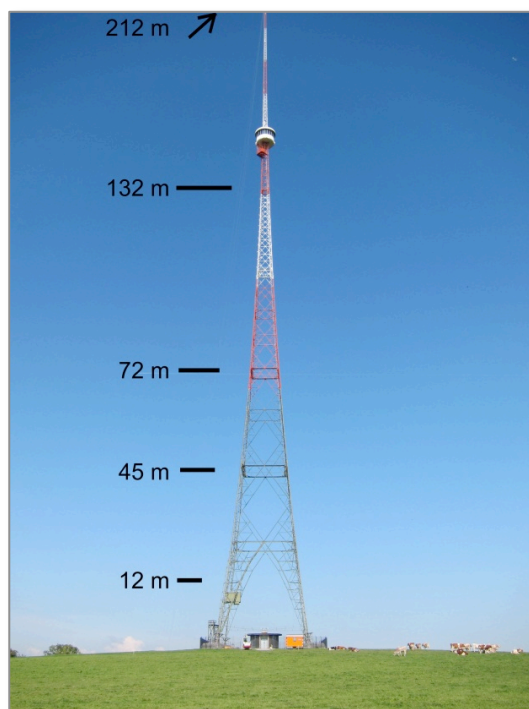
Carbocount-CH: Quantifying greenhouse gas fluxes and their sensitivity to climate variations
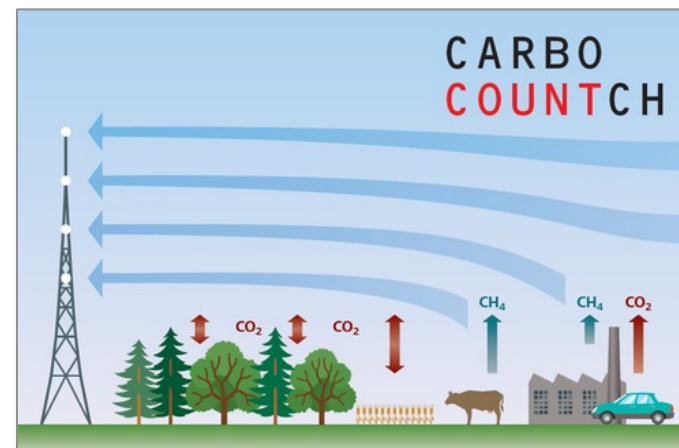
D Brunner

- **Large initiative funded by SNF**
- PI: D. Brunner 1.4 mCHF 01.2012 – 12.2014
- Empa, ETH, University of Bern, C2SM

CARBO COUNTCH

- **One common objective:**
- Improve our understanding of biosphere-atmosphere exchange processes
- Provide estimates of CO_2 and CH_4 fluxes in CH
- Modeling component based on COSMO

- **Main Achievements**
- E.g., Successful installation of the first three sites of measurement network

212 m
132 m
72 m
45 m
12 m

Beromünster tower

The CH2011 Climate Scenarios

- **Goal**: Make available Swiss climate change scenarios for impact scientists, governmental agencies, and other interested parties.

- **Broad collaboration** (beyond C2SM)
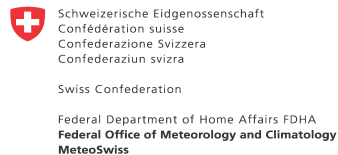
- **Published** on Sep. 28, 2011 and widely disseminated (e.g., CH2014-Impact Initiative)

- **Followed up by CH2011+**
  - Complement the CH2011 scenarios with consistent data
  - Support the CH2014-Impact initiative
  - Organize the next generation of Swiss climate change scenarios

Swiss Climate Change Scenarios CH2011

11
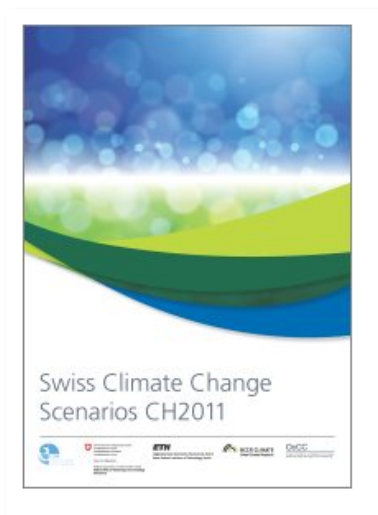
High-Performance Computing activities

- **HP2C Projects**
- COSMO, OPCODE, COCoNet, 1.65 mCHF 01.2010–06.2013
- MeteoSwiss, CSCS, ETH, C2SM, Supercomputing Systems AG

- **One common objective:**
- Prepare COSMO for the next generation of computers

- **Main Achievements**
- Rewrite of COSMO dynamical core
- Version of COSMO running on GPU-hardware
- Very successful collaboration of domain scientists, computer scientists and computer vendors
- Climate/Weather was selected as one of the 5 Domain Science Networks in CH!

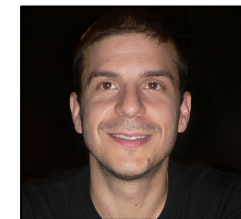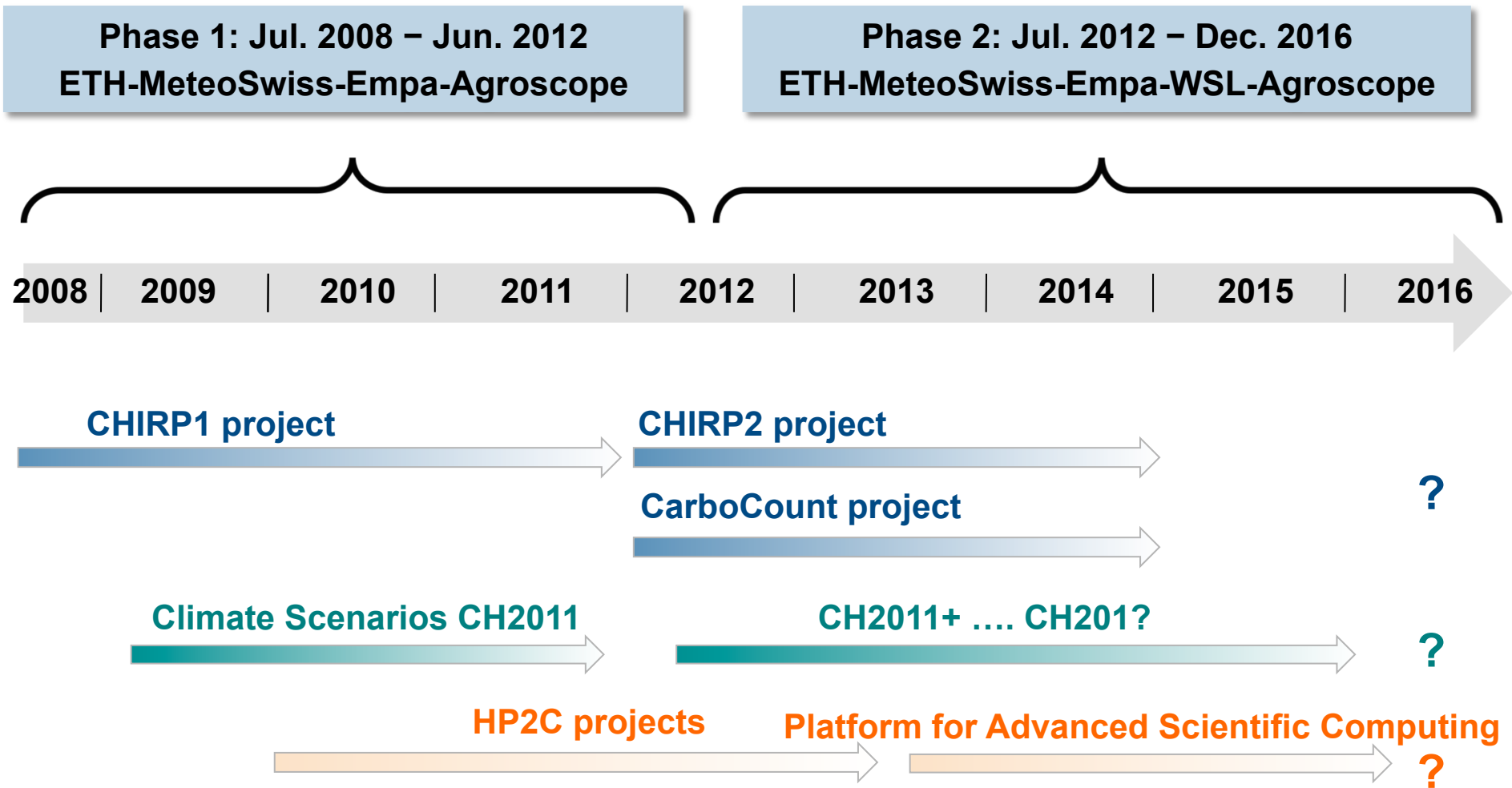- **Next step: Platform for Advanced Scientific Computing** (PASC: http://www.pasc-ch.org/)

O Fuhrer (MCH)

T Schulthess (CSCS)

X Lapillonne

C Osuna

CSCS

HP2C High Performance and High Productivity Computing

Objectives of the meeting

- **Inform [and get feedback from] the Community**

13:30 Community Services and Thematic Working Groups

13:35	Global Climate Modeling	Grazia Frontoso
13:50	Regional Climate Modeling	Anne Roches
14:05	Climate Data	Harald von Waldow
14:20	Communication and Outreach	This Rutishauser
14:30	Discussion	

- **Initiate discussions about topics to be tackled by the Community**

15:15 Which Future for C2SM?

15:15	Future directions	Niki Gruber
15:30	Towards high-resolution climate simulation	Christoph Schär et al.
15:45	Geo-engineering	Ulrike Lohmann/Sonia Seneviratne et al.
16:00	Future climate projections for impact studies	Christof Appenzeller et al.
16:15	Air quality-climate interactions	Brigitte Buchmann/Dominik Brunner et al.
16:30	Discussion	

- **Bring together the Community**

17:00 Apero!

Additional slides

Working Groups

- **Global Climate Modeling: Grazia Frontoso**
  *T. Peter, E. Rozanov, U. Beyerle, M. Wild, R. Knutti,
  S. Ferrachat, M. Münnich, U. Lohmann, S. Seneviratne,
  D. Folini*

- **Regional Climate Modeling: Anne Roches**
  *H. Wernli, D. Brunner, P. Steiner, S. Seneviratne, C. Schär,
  D. Lüthi, D. Byrne, U. Lohmann, W. Sawyer*

- **Climate Data Analyse and Dissemination: Harald
  von Waldow**
  *S. Kotlarski, A. Gilli, R. Knutti, M. Funk, W. Eugster,
  M. Liniger, D. Folini/M. Wild, N. Zimmerman*

Technical Clinics: a proposal

- **Trial session in October 2013 on the topic "Good practices in code development"**
  - Documentation, code design, coding standards
  - Debugging and performance analysis
  - Versioning systems

- **Proposal**: regular sessions (e.g. every 2 months) to cover technical topics proposed by the Community

- **Give your opinion**: We need your inputs to better match your needs!

Thanks to *Urs Beyerle, Sylvaine Ferrachat, Doris Folini, Daniel Leuenberger, Daniel Luethi, Michael Sprenger*