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Prof. Gerald Haug, Geological Institute, ETH Zurich
Prof. Ulrike Lohmann, Institute for Atmospheric and Climate Science, ETH Zurich

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Prof. Johannes Stähelin, Institute for Atmospheric and Climate Science, ETH Zurich
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Bundesamt für Meteorologie und Klimatologie MeteoSchweiz

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Eidgenössisches Volkswirtschafts-departement EVD
Forschungsanstalt Agroscope Reckenholz-Tänikon ART

EMPA
Materials Science & Technology

C2SM

Center for Climate Systems Modeling

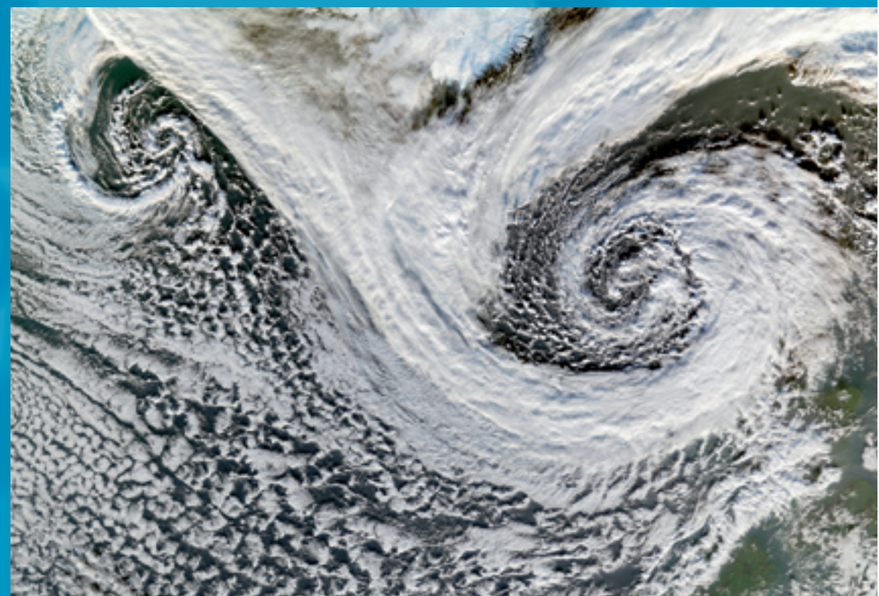


Foto: NASA/courtesy of nasaimages.org

C2SM Center for Climate Systems Modeling

ETH
Eidgenössische Technische Hochschule Zürich
Swiss Federal Institute of Technology Zurich

Center for cross-institutional research

Climate change is one of the most complex scientific challenges and one of the most pressing social and economic issues facing humankind. The Center for Climate Systems Modeling (C2SM) is a measured response of the climate research community in the Zurich area to these challenges.

Established in 2008, the Center combines the climate modeling and data analysis expertise of ETH Zurich, MeteoSwiss, Empa, and Agroscope Tänikon (ART). The Center's aim is to develop an improved understanding of the climate system, and to encapsulate this knowledge into improved models used to predict and project weather and climate into the future.

C2SM is structured around a group of associated members and staff, directed by a steering committee and run by an executive director. It encompasses the technical and scientific expertise of more than 200 climate scientists. The Center currently receives funding from the ETH-Foundation, ETH Zurich, MeteoSwiss, Empa, and ART.

"Towards an improved capability to understand and predict Earth's climate and weather."

Objectives

Numerical models have become central elements of both research and service activities related to weather and climate. They are now used for many applications including short-term weather forecast, seasonal climate prediction, climate projections (decades to century), and the testing of strategies to reduce and adapt to climate change. While climate models made rapid progress in the last decades, they still suffer from considerable limitations, for instance regarding the role of aerosols or the representation of the hydrological cycle.

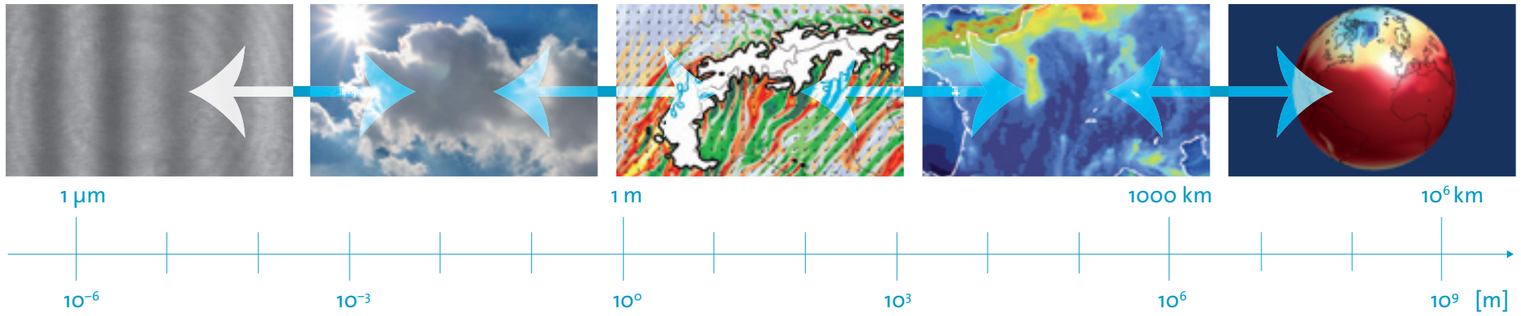
A fundamental challenge faced by the modeling community is that climate and weather result from a large number of physical, chemical, and biological processes that operate over a wide range of spatial and temporal scales and are interlinked in a complex manner. A particularly vexing problem is that the processes operating at the small scale strongly influence the phenomena at global scale and vice versa. C2SM's core research theme, i.e. "multi-scale interactions within the climate system" is geared explicitly to address this problem.

The main objectives of the Center are to develop the tools and methods necessary to bridge the gap between the different spatio-temporal scales and between the different (atmospheric, hydrological, oceanographic and terrestrial) components of the climate system. In turn, this will increase our understanding and sharpen our predictive capability of climate variations and change on time scales from days to millennia.

Activities

The Center is active in several ways including research, user support, scientific animation, teaching, and outreach activities. It focuses on the following:

- To maintain, improve, and make available to the Center's community a hierarchy of state-of-the-art climate and climate-related models. In particular, the Center seeks to refine and enhance a global and a regional climate model as well as the associated modules for, e.g., aerosol, (biogeo)chemistry, ocean, land surface, and clouds.
- To utilize climate models by conducting comprehensive simulations and diagnostics extending over a wide range of temporal and spatial scales.
- To exploit and disseminate key national and international data sets by providing a repository for them and by developing analysis and data management tools. A special emphasis will be given to the provision of future climate scenarios at scales relevant for Switzerland.
- To prepare for and exploit the next generation of high-performance computers, and thereby continue to contribute at the highest level to climate system science.
- To foster the collaboration between research groups by facilitating scientific discussions and the preparation of joint proposals and to learn from environmental stakeholders who will exploit the Center's services.



The range of scales investigated by C2SM goes from the scale of a tiny water droplet in the air (a few micrometers) to the entire globe (thousands of kilometers).