

# WCRP - World Climate Research Programme

## CliC - Climate and Cryosphere Project



Promoting and facilitating new collaborative research related to the cryosphere and climate.

Making links between cryospheric research and research in other disciplines

Communicating research results to policy and decision-makers and other non-scientific users.



[www.climate-cryosphere.org](http://www.climate-cryosphere.org)

Project Office Hosted by:



# WCRP - World Climate Research Programme

## CliC - Climate and Cryosphere Project

### WORLD CLIMATE RESEARCH PROGRAMME ORGANIZATION

JOINT SCIENTIFIC COMMITTEE (JSC)

WCRP MODELLING ADVISORY COUNCIL (WMAC)

WCRP DATA ADVISORY COUNCIL (WDAC)

WORKING GROUPS ON: COUPLED MODELLING (WGCM), SUBSEASONAL TO INTERDECADAL PREDICTION (WGSIP),

F (JPS)

**GRAND CHALLENGES ON:** CLOUDS, CIRCULATION AND CLIMATE SENSITIVITY;  
**MELTING ICE AND GLOBAL CONSEQUENCES;** UNDERSTANDING AND PREDICTING WEATHER AND CLIMATE EXTREMES;  
REGIONAL SEA-LEVEL CHANGE AND COASTAL IMPACTS; WATER FOR THE FOOD BASKETS OF THE WORLD;  
AND CARBON FEEDBACKS IN THE CLIMATE SYSTEM



CRYOSPHERE-  
CLIMATE



OCEAN-  
ATMOSPHERE



LAND-  
ATMOSPHERE



TROPOSPHERE-  
STRATOSPHERE



REGIONAL CLIMATE  
DOWNSCALING

JO

**GRAND CHALLENGES ON:** CLOUDS, CIRCULATION AND CLIMATE SENSITIVITY;  
MELTING ICE AND GLOBAL CONSEQUENCES; UNDERSTANDING AND PREDICTING WEATHER AND CLIMATE EXTREMES;  
REGIONAL SEA-LEVEL CHANGE AND COASTAL IMPACTS; WATER FOR THE FOOD BASKETS OF THE WORLD;  
AND CARBON FEEDBACKS IN THE CLIMATE SYSTEM



[www.climate-cryosphere.org](http://www.climate-cryosphere.org)



# CliC structure

## Scientific Steering Group (SSG)

Co-chairs:

Gerhard Krinner (until end of 2017)

Greg Flato (until end of 2016)

James Renwick (starting in 2017)

## International Project Office

Director: Lawrence Hislop

Executive Officer: Gwénaëlle Hamon

*Hosted by the Norwegian Polar Institute*

WCRP Grand Challenge – Melting Ice and Global Consequences, Lead: CliC, Chair: Greg Flato

- Earth System Model-Snow MIP (ESM-SnowMIP) (tightly linked to Land Surface, Snow and Soil Moisture MIP (LS3MIP))\*
- Ice Sheet MIP for CMIP6 (ISMIP6)\*
- Marine Ice Sheet-Ocean MIP (MISOMIP)\*
- Diagnostic Sea Ice MIP (SIMIP)\*
- GlacierMIP
- Permafrost Carbon Network (part of the Study of Environmental Arctic Change (SEARCH) project)

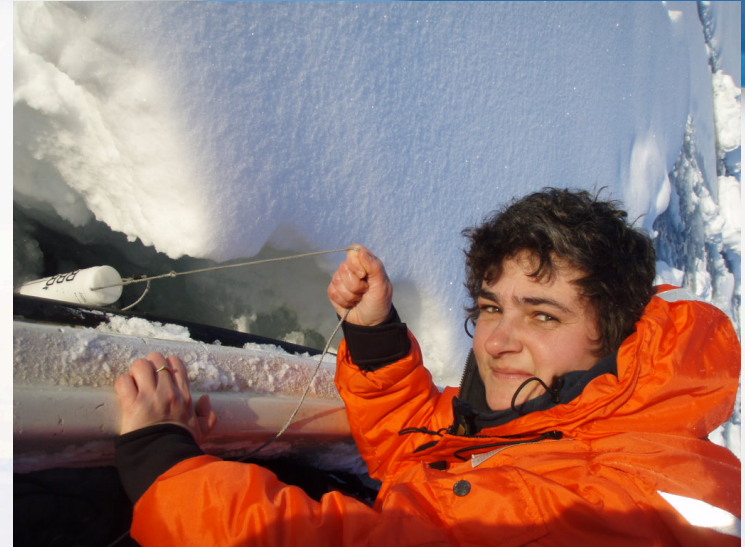
\* Contributions to CMIP6, the 6th Phase of the Coupled Model Intercomparison Projects (MIP)





# Proposed new co-chair: Fiamma Straneo

- Ice sheet/ocean interactions
- Woods Hole →  
Scripps Institution of Oceanography
- Strong involvement in CliC + CLIVAR activities
- Co-director of GRISO (Greenland Ice Sheet-Ocean Network)
- Co-lead of the SEARCH (Study of Environmental Arctic Change) Land-Ice Panel
- Member of the US AMOC (Atlantic Meridional Overturning Circulation) Science Team



# CliC structure

## Groups, Panels, and Fora

- Polar Climate Predictability Initiative (PCPI) *(joint with SPARC)*
- Southern Ocean Region Panel *(joint with CLIVAR and SCAR)*
- Antarctic Sea Ice Processes & Climate (ASPeCt) *(joint with SCAR)*
- Technical Committee on Sea Ice Observations
- Arctic Sea Ice Working Group
- Sea Ice & Climate Modelling Forum
- Ice Sheet Mass Balance and Sea Level (ISMASS) *(joint with SCAR and IASC)*

## Limited Lifetime Targeted Activities

- Polar Coordinated Regional Downscaling Experiment (Polar CORDEX)
- Arctic Freshwater Synthesis *(completed)*
- Southern Ocean Satellite Requirements *(completed)*
- Where Are They Now? *(completed)*
- Interactions Between High-latitude Cryosphere Elements
- Earth Observations and Arctic Science Needs (with ESA)
- Linkage Between Arctic Climate Change and Mid-Latitude





# Activities

- Arctic Freshwater Synthesis
  - CliC/IASC/AMAP/Norwegian government
    - The Nordic Council of Ministers & The Arctic Council are prioritising freshwater in their upcoming chairmanships
  - Integrative study focusing on storage, fluxes and effects. Increasing changes to Arctic freshwater systems affecting the Arctic environment, society and economy → consequences at the global level.
  - Eight scientific papers published in special issue of JGR Biogeosciences
  - Results being integrated into SWIPA II (Snow, Water, Ice, and Permafrost in the Arctic II) report.



# Activities

- Modelling/CMIP6
  - CliC is leading the cryosphere modelling that will underpin the 6th assessment reports being prepared by the IPCC
  - Covers snow, sea ice, ice sheets, and glaciers, allows for targeted analysis of coupled model performance, and analysis of uncertainty in projections
    - ISMIP, MISOMIP, GlacierMIP, ESM-SnowMIP, SIMIP, Polar CORDEX
    - Links to the CliC-supported Permafrost Carbon Network (PCN)
  - Will contribute directly and visibly AR6 and SR on the Oceans and Cryosphere
    - A tangible addition to the broader WCRP contributions to climate science that IPCC ultimately depends upon





# Activities

- Sea ice
  - Arctic sea ice working group; ASPeCt (Antarctic)
  - Technical Committee on Sea Ice Observations
  - BEPSII: Biogeochemical Exchange Processes at Sea Ice Interfaces
- Regional activities etc
  - SORP: SCAR/IASC/CLiC Southern Ocean Region Panel
  - NORP: CLIVAR/CLIC Northern Oceans Region Panel
  - Interactions Between Cryosphere Elements
  - Polar CORDEX: Arctic & Antarctic
  - PCPI
- Support for many workshops;  
Conferences; Communications activities





# Science issues

- Biogeochemistry
  - BEPSII (with SOLAS). Integrative: observing & modelling, small & large scales
  - Permafrost carbon. Permafrost Carbon Network, iLEAPS, Biogeochemistry GC.
- Linkages between different elements of the high-latitude cryosphere
  - Bridge/integrate work on sea ice, ice shelf, ice sheet, ocean, permafrost and atmosphere
- Polar-lower latitude linkages
  - Rapidly evolving area. Possible focus of NORP. Prevent duplication



# Issues

- How to work together...
  - With other Core Projects
    - Lots of activity across Projects (GEWEX, CLIVAR; CORDEX; also ex-IGBP: SOLAS, iLEAPS): Prevent duplication
    - Quarterly coordination/planning meetings with all Project Directors
  - With WGCM & WMAC
    - Gerhard Krinner and Greg Flato link to WMAC and WGCM
  - With WDAC + GCW
    - Sea ice observing practices
  - With Grand Challenges
    - Melting Ice, Global Consequences
      - ➔ CMIP6; ISMIP6, SIMIP, ESMSnowMIP, and GlacierMIP
    - Biogeochemistry: Permafrost





# Issues

- Evolution of the cryosphere community
  - High profile as a result of rapid change (especially Arctic)
  - Increasingly crowded network of initiatives with similar goals
  - Excellent links with WCRP JPS, regular on-line meetings
    - Assistance with allocation of resources, and strategy
- Funding support
  - Recent decline in funds for CliC → less activity in 2017
  - CliC SSG made funding distribution decisions in February
    - Some projects & activities will get no support this year.
  - Project office actively looking for other sources of funding



# Questions?



WCRP JPS Liaison Mike Sparrow, CliC Co-Chairs Gerhard Krinner, Greg Flato (former), James Renwick (new), CliC Executive Officer Gwénaëlle Hamon, and CliC Director Lawrence Hislop at the WCRP JSC Meeting in Geneva, April 2016