

# GEWEX CMIP6 activities

GEWEX involved in several CMIP6 projects:

- LS3MIP (land surface, snow and soil moisture MIP)
  - LUMIP (land use MIP)
  - HighResMIP
- } “LandMIPs”
- CFMIP
  - CORDEX

Feedback on MIPs provided to WGCM, S. Seneviratne and G. Stephens

H2020 projects providing European-based funding for LS3MIP, LUMIP and HighResMIP simulations (H2020 CRESCENDO, H2020 PRIMAVERA)

NB: Some new activities focused on 1.5° (HappiMIP and HappiLand simulations)

# LS3MIP (Land Surface, Snow, and Soil Moisture MIP)

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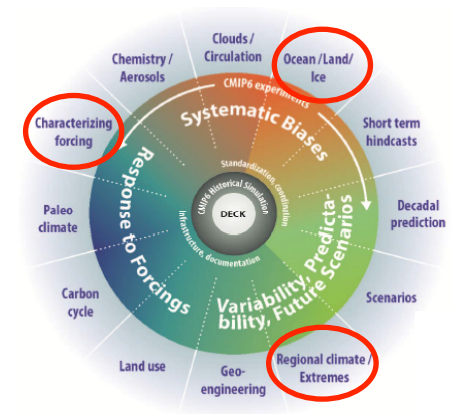
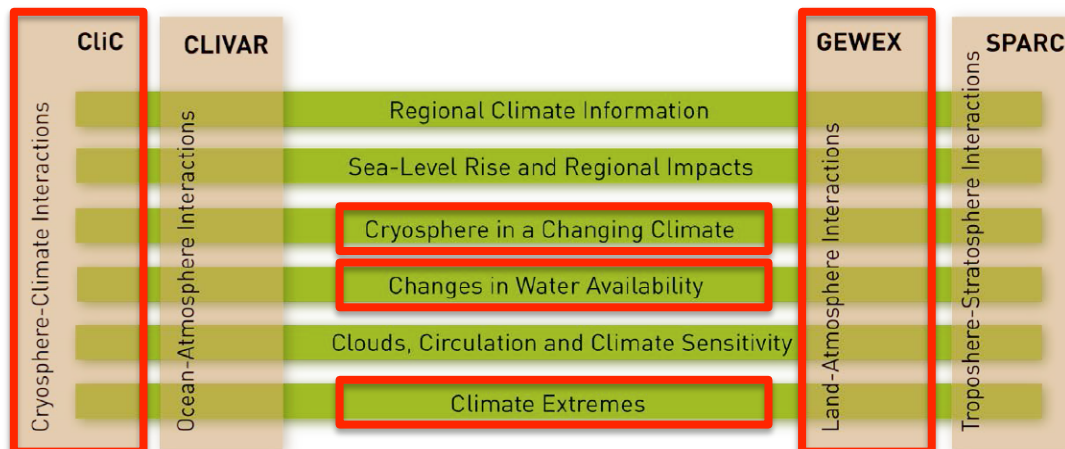


## Joint GEWEX and CLIC activity

## Follow-up to ESM-SnowMIP, GLACE-CMIP, and GSWP3

# LS3MIP (Land Surface, Snow, and Soil Moisture MIP)

- Offline reference land simulations: “LMIP”
- Coupled sensitivity experiments investigating the impacts of snow- and soil moisture-climate interactions (process understanding, constraints)



# LUMIP (Land Use MIP)

Co-chairs: David Lawrence (NCAR) and George Hurtt (University of Maryland)

SSG: Almut Arneth, Victor Brovkin, Kate Calvin, Andrew Jones, Chris Jones, Peter Lawrence, Nathalie de Noblet-Ducoudré, Julia Pongratz, Sonia Seneviratne, Elena Shevliakova

With involvements of GEWEX (GLASS) and ILEAPS



What are the effects of land use and land-use change on climate and biogeochemical cycling (past-future)?

Are there regional land management strategies with promise to help mitigate and/or adapt to climate change?

- Fossil fuel vs. land use change
- Biogeochemical vs. biogeophysical impact of land use
- Land cover vs. land management impacts
- Modulation of land use impact on climate by land-atmosphere coupling strength (LS3MIP)
- Modulation of global CO<sub>2</sub> fertilization by land use

CMIP6 Questions: How does Earth System respond to forcing?  
WCRP Grand Challenge: Biospheric forcings and feedbacks ,  
Water Availability, Climate Extremes

# LandMIPs (LS3MIP and LUMIP)

- Interactions and coordination between LS3MIP and LUMIP (e.g. regarding offline land experiments)
- “LandMIP” workshop in October 2015
- Planned possible joint LS3MIP-LUMIP-C4MIP conference in 2018 (fall)



that provide a deeper understanding of mountain precipitation processes, and to facilitate improvements in numerical weather prediction models, climate models, and hydrological models. The development of observational data sets will be a central activity. In particular, MOUNTTerrain will focus on a collation of existing digitized observational data for high-elevation precipitation, and data rescue of high-elevation precipitation records (including quality control), including undigitized meteorological station records and ski-field and alpine clubs records, global and regional reanalysis products, and climate model precipitation fields from CMIP5 and 6.

Some of the key questions to be addressed include:

- How useful are (and how best to use) remotely sensed and gridded data sets, such as TRMM, GPCP, and reanalyses for characterizing high-elevation precipitation?
- How well are we measuring solid precipitation in moun-

## Land Processes, Forcings, and Feedbacks in Climate Change Simulations: The CMIP6 “LandMIPs”

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# Interactions with other core projects (CLIVAR, CliC, SPARC)

## CLIVAR:

Interactions in following areas: Monsoon panel, Surface energy and water balances, ETCCDI, Extremes GC

## CliC:

Join coordination of LS3MIP CMIP6 experiment

PROES: Evaluation of snow processes

Land surface and snow modeling; cold regions processes; observations of surface water budget

## SPARC:

Involvement in extreme GC

Potential interactions with GASS

## GEWEX 2016 meetings (selection)

- Several workshops and meetings as part of the Water and of the Extremes GC (see separate reports)
- 2<sup>nd</sup> Pannex Workshop on the Climate System (June 1-3, 2016)
- Earth's hydrological sensitivity to climate change, Reading (UK) (June 20-22, 2016)
- GEWEX-SoilWat Workshop, Leipzig (Germany) (June 28-30, 2016)
- Including Water Management in Large-scale Models (September 28-30)



## Other relevant topics

- Contribution to other events/conferences: CLIVAR OSC, UNESCO Kovacs colloquium
- Planning of 2018 OSC conference on “Water and Extremes”
- WCRP “out of the box” workshop and future development

## GEWEX soils initiative

Bottom-up initiative, strong motivation of soil research community;  
also corresponds to previous request from JSC

Workshop took place in June 2016

*Reporting mechanism? To SSG or to GLASS?*



# GEWEX Aerosol Precipitation Initiative (GAP)

Sue van den Heever and Philip Stier

Image: Astronaut Alex Gerst on ISS on September 8, 2014



# Aerosols and Precipitation? There exists a GAP!



GAP  
Sue van den Heever and Philip Stier



# GEWEX Aerosol Precipitation (GAP)



GAP



Sue van den Heever

Philip Stier



A NEW GEWEX Initiative

GAP  
Sue van den Heever and Philip Stier





## GASS

The Global Atmospheric System Studies Panel coordinates scientific projects that bring together experts to contribute to the development of atmospheric models.



## GHP

The GEWEX Hydroclimatology Panel aims to understand and predict continental to local-scale hydroclimates for hydrologic applications.



## GLASS

The Global Land/Atmosphere System Study focuses on model development and evaluation, concentrating on the new generation of land surface models.



## GDAP

The GEWEX Data and Assessments Panel guides the production and evaluation of long term, global atmospheric, surface water, and energy budget products.

## GAP

GAP

Sue van den Heever and Philip Stier

# GEWEX Aerosol Precipitation (GAP)

## GAP GOALS:

1. Enhance our understanding of **aerosol-precipitation interactions** on a **regional to global scale** with a focus on energetics and water budgetary constraints in a regime based context
2. Facilitate connections between all GEWEX cloud-aerosol-precipitation activities
3. Interface with iLeaps/GEWEX/IGAC Aerosols, Clouds, Precipitation and Climate (ACPC) initiative to investigate aerosol and cloud processes on a local to cloud system scale

GAP

Sue van den Heever and Philip Stier



- Series of small round table discussions
  - First discussion: ACPC workshop held in Oxford in April 2016
  - Second discussion: GAP workshop to be held in Oxford on 28-30 June 2017
  - Third discussion: in planning phase
- Produce a review paper on the current evidence for aerosol effects on precipitation
- Link to WCRP Grand Science Challenges where possible
- Establish a white paper outlining GAP's "Grand Science Challenges"
- Implement the goals and strategies of the white paper



## Aerosols, Clouds, Precipitation and Climate (ACPC)

- iLeaps/GEWEX/IGAC initiative
- To investigate and quantify aerosol and cloud processes on a **local to cloud system** scale
- Stier and van den Heever are on the ACPC steering committee thereby facilitating GAP – ACPC communication

GAP

Sue van den Heever and Philip Stier

GEWEX SSG meeting, 2017 - Co-chairs' report

# Aerosols, Clouds, Precipitation and Climate (ACPC)

- Two cloud regime roadmaps: deep convection (Co-leads: Ann Fridland and Sue van den Heever) and shallow clouds (Lead: Rob Wood)
- Past workshops:
  - April 2015 at NASA-GISS in New York
  - April 2016 at the University of Oxford.
- Next workshop: 2-5 April in Bad Honnef, Germany
  - to investigate based on model simulations as to which observations offer most promise in identifying signatures of aerosol effects on clouds and precipitation
  - ultimate goal: comprehensive field campaign and associated box closure study for a GCM grid box (Rosenfeld et al 2014)

GAP

Sue van den Heever and Philip Stier

GEWEX SSG meeting, 2017 - Co-chairs' report

## US GEWEX activities

See separate presentation (IGPO)

# HighRes activity and HighResMIP

See separate presentation

## Summary:

Several new activities (GEWEX wide and providing interfaces to other research communities)

Panel activities: See individual reports

To be discussed:

- Integration between panels, contribution of panels to GCs, new activities
- New future of GASS or replacement
- Relevance of questions of out-of-the-box workshop
- 2018 OSC conference