Welcome to our Castle

March 23-28 2014, Schloss Ringberg

Grand Challenge Workshop on Clouds, Circulation and Climate Sensitivity

Abbot, Bauer, Becker, Biasutti, Bony, Coppin, Del Genio, Dufresne, Douville, Emanuel, Frierson, Fu, Hargreaves, Harrison, Held, Hohenegger, Hoskins, Jakob, Kageyama, Kang, Kawai, Klein, Loeb, Mapes, Mauritsen, Miller, Muller, Pincus, Prentice, Risi, Satoh, Schumacher, Shepherd, Sherwood, Siebesma, Sobel, Stevens, Watanabe, Webb, White, Wielicki, Yoshimori, Zuidema

All participants confirmed.

Goal of the Workshop

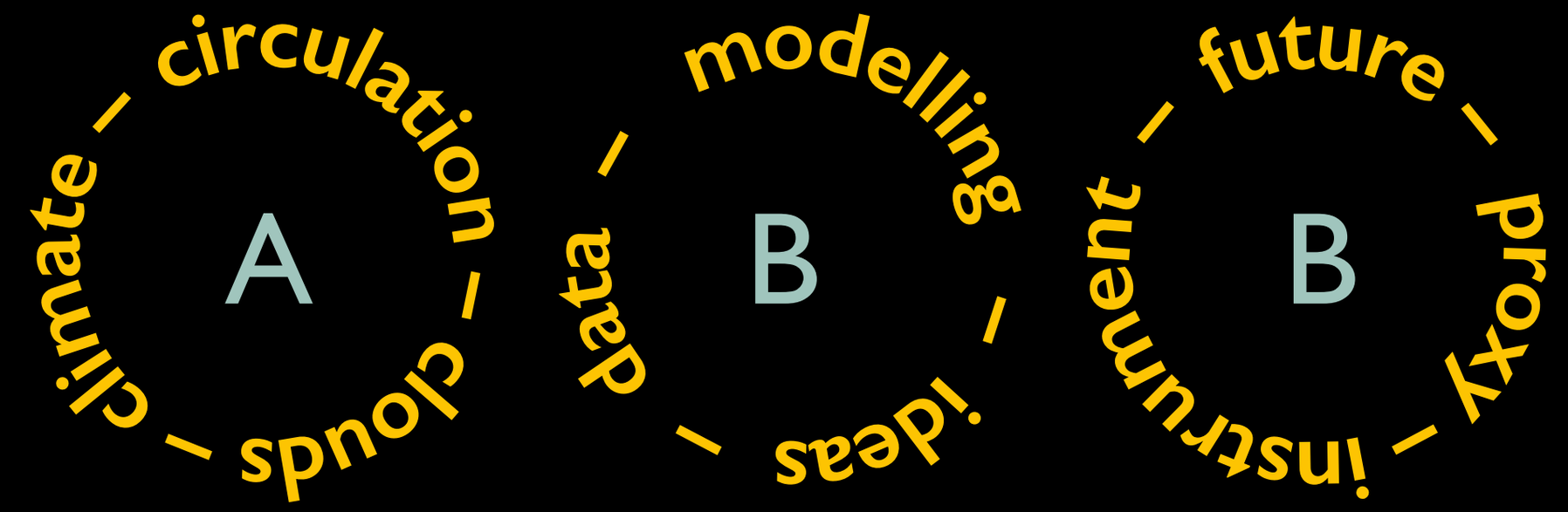
To advance the articulation of our grand challenge by
– answering a few questions
– articulating a few* more.

**cf Sandrine's point that the grand challenges are posed very broadly, but are meant to be very specific. Our hypothesis is that clearly articulating a few important scientific questions will be more valuable than listing a large number of possible activities. Less is better!*

Who are We

A diverse group of people interested, to varying degrees, in the role of clouds and convective processes in the climate system.

In identifying participants we were interested in developing ideas and links.



These will be explored in breakout groups throughout the workshop.

but hopefully not a three ring circus

Questions to Answer

Should we work toward major new observational program?

- *A tropical experiment (WATER)?*
- *A radiative convective equilibrium experiment?*
- *An energy budget initiative?*
- *Something else (Paleo Record)?*
- *…?*

Should we work toward our own assessment on a five to ten year timeframe?

Should we be advocating for specific facilities, and if so what are their candidates?

Should an Educational Component be Added (B3)?

What will be the contours of an article describing this grand challenge?

What other papers should be written to help stimulate activity in the field?

This is a 'filling in week' but is the basic framework we have outlined missing anything?

Questions to Articulate (first decide, then articulate)

How do cloud processes (e.g. cloud-radiation interactions, convection-humidity interactions, convection/ cloud-surface flux interactions) contribute to the large-scale organization of cloud systems (e.g. self-aggregation) particularly the MJO and the ITCZ? (A1 & A2)

Are the storm tracks, and storminess, sensitive to the representation of clouds and convective processes, and if so how? (A1)

What is the best strategy for linking GCMs to very high resolution cloud-resolving modeling? (A2)

Is there evidence of out-of-sample climate behaviour in the real-world compared to current GCMs, and if so, what is missing in the GCMs (stochasticity, organization) ? (A2 & A3)

How do we understand / constrain the variety of different modelled cloud feedbacks? (A3)

What would be metrics for progress? (All)

Once we decide on the questions, how do we link to observations, model development, experimental (e.g., CMIP6), and (educational) activities? (B)

Breakout Groups

A1: Changing Patterns (Ted/Adam)
A2: Cloud Circulation Coupling (Dargan/Pier)
A3: Climate & Hydrological Sensitivity (Steve/Mark)
B1: Using Observations, from isotopes to satellites (Masa/Robert)
B2: Advancing Model Development (Christian/Masahiro)