Cryosphere Working Group meeting

Cryosphere Working Group – Fenner Room

https://anu.zoom.us/j/82593173498?pwd=bt5OM9Alm4i70b4JFGMbeapAmEXvtk.1

Meeting ID: 825 9317 3498
Password: 867571

Time	*Item*	*Facilitator*
8:30-9:00		
9:00-9:30	Welcome by ACCESS	ACCESS-NRI
9:30-11:00	Science talks (10 mins + questions) - Claire Yung: *MOM6 ice shelf cavities and ongoing ice shelf cavity modelling challenges* - Paola Papapetros: *The influence of subglacial water laden sediments on ice shelf basal melting* - Xuebin Zhang: *CSIRO sea level reconstruction v2* Lightning talks (3 mins + questions) - Edward Doddridge: *Ocean Warming and Antarctic Sea Ice Loss* - Chen Zhao: *Evaluating an accelerated forcing approach for improving computational efficiency in coupled ice sheet-ocean modelling* - Felicity McCormack: *the impact of subglacial hydrology on ice dynamics and ocean-driven ice shelf melt using ISSM*	Chen Zhao
11:00-11:30	Morning tea and poster session	
11:30-13:00	Planning: - ISSM Python API and plans - CMWG Agenda for 2024	Mike Tetley + Felicity McCormack

13:00-14:00	Lunch	
14:00-15:20	Pseudo hackathon *Come prepared with a scientific question or output. Work in groups of 2-3 to develop some pseudocode.*	Lenneke Jong
15:20-15:30	Wrap up	
15:30-16:00	Afternoon tea	

Lighting talks

Edward Doddridge (UTAS)

Title: Ocean Warming and Antarctic Sea Ice Loss

Chen Zhao (UTAS)

Title: Evaluating an accelerated forcing approach for improving computational efficiency in coupled ice sheet-ocean modelling

Summary: We introduce an “accelerated forcing” approach to address the timescale discrepancy and thus improve computational efficiency in a framework designed to couple evolving ice geometry to ice shelf cavity circulation.

Felicity McCormack (Monash)

Title: the impact of subglacial hydrology on ice dynamics and ocean-driven ice shelf melt using ISSM.

Summary: We use the ISSM coupled with the Glacier Drainage System subglacial hydrology model (GlaDS) to investigate the impact of subglacial hydrology on ice-sliding and ocean-driven melt in the Aurora Subglacial Basin. We find that the coupled model produces much earlier and more extensive retreat in the Totten and Vanderford Glaciers than a stand-alone ice sheet model, with consequent higher sea level contribution over the 21st Century, highlighting the important role of subglacial hydrology in accelerating sea level rise.

Longer science talks

Claire Yung (ANU)

Title: MOM6 ice shelf cavities and ongoing ice shelf cavity modelling challenges

Summary: Updates on current situation of MOM6 ice shelf cavity development, and insights to ongoing ice shelf cavity modelling challenges, guided by results of the ISOMIP+ project

Paola Papapetros (UTAS)

Title: The influence of subglacial water laden sediments on ice shelf basal melting

Summary: Antarctic ice shelves have been experiencing increased mass loss in recent decades, which has been mainly driven by the basal melting of floating ice shelves. Changes in the grounding zone, where the grounded ice sheet transitions to an ice shelf, are of primary importance to this volume loss. While tides and subglacial freshwater contribute to increased basal melting, the impact of sediment transported by this outflow on ice shelf cavity dynamics remains poorly known. To explore the role of the subglacial water laden sediments on ocean circulation, we performed a range of model experiments, which revealed that the presence of sediment reduces basal melt rates.

Xuebin Zhang (CSIRO)

Title: CSIRO sea level reconstruction v2

Summary: The CSIRO sea-level team published the first-ever global sea level reconstruction over the 20th Century (Church and White, 2006, 2011). Since then, several international sea-level groups have also developed various sea level reconstructions. However, a large spread of long-term sea level trend since 1900 (1.3~2.0 mm/yr) exists among available reconstructions. With a better understanding of sea level contributions, we built upon the previous CSIRO sea level reconstruction method and included three additional factors: sea level fingerprints (in response to land ice melting), steric dynamic sea level (SDSL) long-term change patterns, and local vertical land motion (VLM) estimates, leading to a better and improved global and regional sea level reconstruction over 1900-2019. The trend of the new GMSL reconstruction is 1.6 ± 0.2 mm/yr over 1900-2019, consistent with the sum of observation-based sea-level contributions of 1.5 ± 0.2 mm/yr. The lower trend from the new reconstruction compared with the original reconstruction is mainly due to the updated VLM correction, while the inclusion of sea level fingerprints and SDSL long-term change patterns are the dominant contributors to the improved skill of regional reconstruction. This new dataset, CSIRO sea level reconstruction - v2, has already drawn attention from the international sea level community and will be well used for sea level research as the original reconstruction. In particular, this updated reconstruction method provides a promising way to identify potential biases in the individual sea level components, constrained by available tide gauge observations globally.