



GC: Regional Sea-level Change and Coastal Impacts

41st Session of the WCRP Joint Scientific Committee

Roderik van de Wal, Robert J. Nicholls, David Behar, Kathy McInnes

May 2020

Online



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Key Science Advancements

Contribute to IPCC SROCC-report

ISMIP contribution to AR6 submitted 10-15 papers

Contribute to WMO Statement on the *State of Global Climate 2019 (WP-6)*

Le Cozannet et al. (2017). Sea level change and coastal climate services: The way forward. *Journal of Marine Science and Engineering*

Stammer et al. (2019) High-end Sea Level Paper, *Earth's Future*

Gregory et al. (2019) Sea Level Terminology Paper, *Surveys in Geophysics*

Hinkel et al. (2019) Meeting user needs for SLR information, *Earth's Future*

Ponte et al. (2019) OceanObs'19 White Paper

Special ISSI on 'Relationships Between Coastal Sea Level and Large Scale Ocean Circulation', *Surveys. of Geophysics*, 15 papers



- SL GC-4 and Workshop in Orleans, France (Nov. 2019)
 - working on a special issue on 'Climate Services for Adaptation to Sea-Level Rise' for *Frontiers in Marine Science*
- Very successful session @ AGU 2019 (3 oral slots) on sea level grand challenge issues
- Decision taken to hold global sea level conference in Singapore in 2022, following Sea Level 2017 (New York).
- Reorganization of work package leaders
 - based on (Expertise, Gender, Age, Regional Spread)



Earth's Future

RESEARCH ARTICLE

10.1029/2019EF001163

Key Points:

- Previous publication of high end sea level differs in their meaning
- Development of new concept for high-end sea level estimates
- High-end estimates have to be a function of scenario and time frame considered

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Stammer, D., van de Wal, R. S. W., Nicholls, R. J., Church, J. A., Le Cozannet, G., Lowe, J. A., et al. (2019). Framework for high-end estimates of sea level rise for stakeholder applications. *Earth's Future*, 7, 923–938. <https://doi.org/10.1029/2019EF001163>

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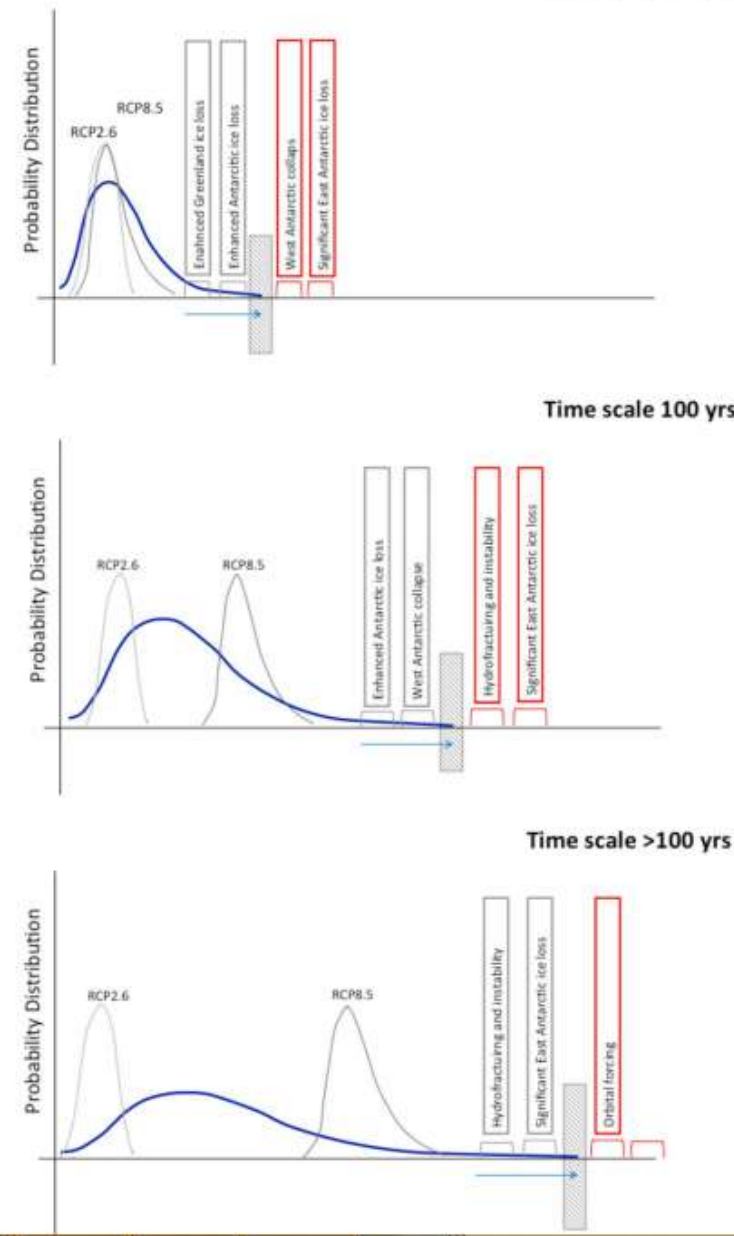
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Framework for High-End E for Stakeholder Application

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Abstract An approach to analyze high-end sea level rise for high-end estimates as a function of time scale, t needs. Instead of developing and agreeing on a set consultation, our effort is focused on the essential ta discussions and demonstrating its feasibility to add high-end sea level rise projections was derived pre highest view of emissions in the Intergovernmenta Representative Concentration Pathway 8.5 scenari solicitations. Ideally, users need high-end sea level sea level frequency distribution, which considers a involved physical mechanisms and natural variabil such information we propose a framework that wo conditional statements (lines of evidence) in combi approach acknowledges the growing uncertainty ir allows consideration of the various levels of risk av policy and adaptation decisions, while maintaining





Membership Update

To strengthen the link with end users and improve geographic representation, two additional co-chairs have been added, and the leadership of the six WPs has been reviewed and updated. The Grand Challenge currently has 32 members.



David Behar



Kathy McInnes

Additional co-chairs

WP1: An integrated approach to paleo time scale sea level estimates

Old: *N Gomez, M Tamisea, R van de Wal*
New: **N Gomez, M Tamisea, T James**

WP2: Quantifying the contribution of land ice to near-future sea level rise

Old: *T Payne, D Holland, B Otto-Bliesner, R van de Wal*
New: **S Nowicki, H Goelzer, B Otto-Bliesner, B Marzeion**

WP3: Causes for contemporary regional sea level variability and change

Old: *R Ponte, B Meyssignac, D Stammer*
New: **R Ponte, B Meyssignac, M Marcos, B Hamlington**

WP4: Projections of regional sea level

Old: *J Gregory, J. Yin, D Stammer*
New: **A Slangen, M Palmer**

WP5: Sea level science for coastal zone management

Old: *K McInnes, G Le Cozannet, R Nicholls*
New: **J. Hinkel J Lowe D. Behar, K. McInnes**

WP6: Sea level budget

Old: *A Cazenave, B Meysignac*
New: **A Cazenave, B Meyssignac, J Chen, M Horwarth**



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WP Priorities

- WP1 Work with PALSEA and SCAR; integrate long-term sea-level data and models
- WP2 Work with ISMIP; ice sheet models and coupling to climate models
- WP3 Understanding regional and coastal sea level variability and change
- WP4 Projection of regional sea level
- WP5 Stakeholder needs; Coastal climate services; Coastal subsidence
- WP6 Understanding the global sea-level budget



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Upcoming Workshops & Conference

1. Workshop on User Interaction, including Arctic perspectives. Autumn 2020 (Victoria, Canada)*
2. Workshop on Coastal Subsidence and Relative Sea-Level Rise. Autumn 2021 (South-East Asia)*
3. Sea Level 2022 Conference in Singapore (500 attendees) -- tentatively July 2022. (following Sea Level 2017 in New York)*

* Linked to Grand Challenge Meetings; expected to be online in 2020 with an uncertain move back towards some physical component in 2021 and 2022 – to be monitored and reviewed.



Participatory Stakeholder Engagement on Sea Level Science, Decision Making and User Needs

Topics:

1. Decision making under deep uncertainty
2. High end SLR – curation for use in decision making
3. Risk management principles and SLR projections
4. Downscaling (e.g., subsidence)
5. Observations and monitoring – decision making needs
6. Governance and Finance

Approach: Series of meetings. Fall 2020 (Virtual): larger group, breakouts, multiple half-days days. Several follow-up meetings leading to Sea Level 2022 – Virtual and/or physical (tbd).



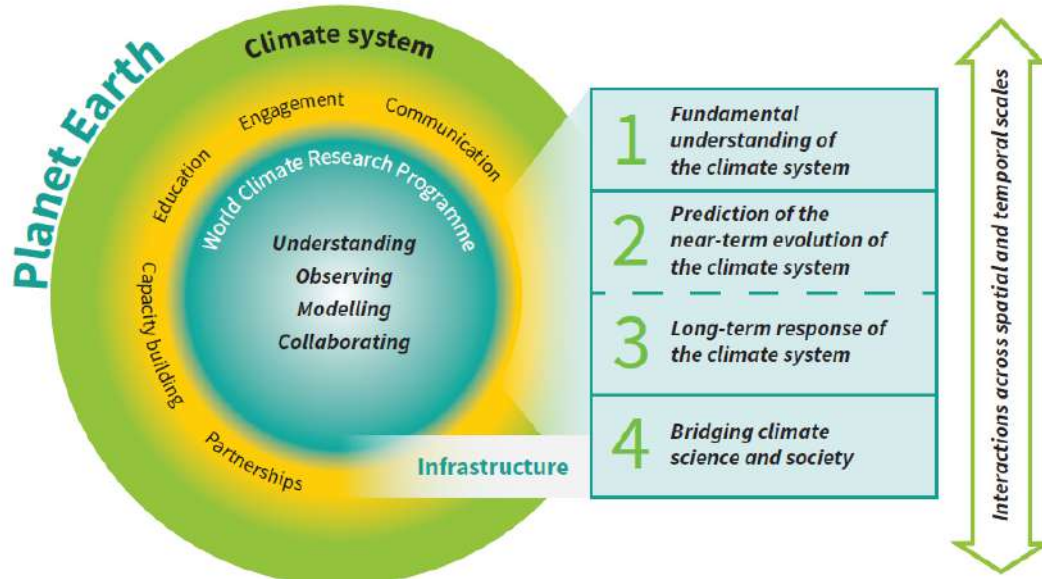
Future Publications

1. Coastal Climate Services Special Issue (2020) *Frontiers in Marine Science*
 - assessment of the current status of coastal climate services and planned activities;
 - identification and mapping of users and their needs;
 - review of existing practices and how they can be improved;
 - translating science to application and communicating uncertainties;
 - frameworks to develop coastal climate services.
2. Follow up of High-end paper framework community paper Stammer et al (2020/21)
3. New sea level budget community effort paper (2021)
4. Global assessment of sea-level rise scenarios in practise (2021)
5. Coastal subsidence and relative sea-level rise (2021/22)



Regional Sea Level Changes and Coastal Impacts

Links to the WCRP Strategic and Implementation Plans



It is relevant to all five Lighthouse Activities, particularly 'Your Climate Risk'.



WCRP Lighthouse Activities

The SL GC is relevant to all four WCRP Scientific Objectives.

All objectives and activities will be addressed at Sea Level 2022 in Singapore, including stakeholder engagement and needs.

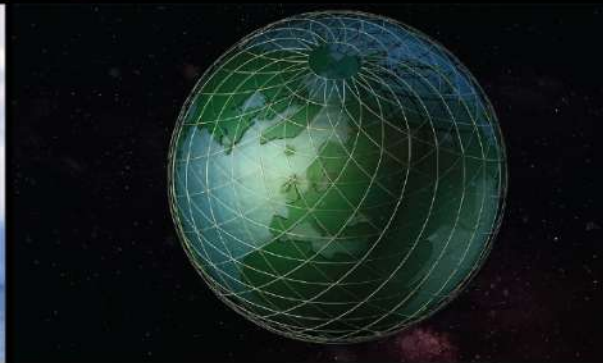


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1. COVID-19 and its further impact on SL GC-5, workshops and conference.
2. Increasing stakeholder engagement to better understand and design the science questions and products for users.
3. Emphasis on Coastal Climate Services to SLC.
 - Incorporation of non-climate driven components related to relative sea level (e.g. human-induced subsidence)
 - High-end, extremes & the Antarctic contribution to SLC
4. Enhanced collaboration with other WCRP activities (e.g. CMIP6 & ISMIP, CESM2-CISM2, CliC, CLIVAR OMDP...)
5. Enhance cooperation with other international bodies on model intercomparisons and international observing programs (e.g. IOC-GLOSS, SCAR, etc.)



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