Update

NASA Sea Level Change Team (N-SLCT)

Version 1 (V1) – 2014-2017
Version 2 (V2) – 2017-2020

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On behalf of the N-SLCT
N-SLCT Sea Level Pyramid

- Future Regional Sea Level
  - $h_i(t) + \text{VLM}$
- Vertical land Motion (VLM)
- GNSS, InSAR, LIDAR
- Models of sea level Processes ($h_i(t)$)
- Climate, ice, sea level, GIA, tides, storm surge
- Satellite and Ground-Based Observations of Changes in the Earth System
  - Satellite altimetry, satellite gravity, InSAR, tide gauge data, ocean temperatures, winds, GNSS, etc.
- Terrestrial Reference Frame ($x, y, z$)

NASA Sea Level Change Team (N-SLCT)
N-SLCT V1 Accomplishments (1)

- Improved understanding of ice sheet dynamics, surface mass balance, bedrock topography, basal conditions, and ocean-ice interactions leading to improved projections of ice sheet mass loss (ISMIP6).
- Improved estimates of mass loss from mountain glaciers and peripheral ice caps.
- Improved estimates of vertical land motion for understanding tide gauge measurements, GIA, and exacerbation of regional sea level change.
- Improved estimates of how changes in terrestrial water storage (TWS) impact sea level changes, especially at interannual and decadal periods.
N-SLCT V1 Accomplishments (2)

- Improved understanding of how interannual (ENSO) and decadal (PDO) sea level variations can exacerbate sea level impacts.
- New tools for computing regional sea level change resulting from ice sheet mass loss.
- New estimates of how sea level rise has impacted nuisance flooding events along the U.S. east coast.
- Improved estimates and understanding of drivers of present-day sea level change, which will lead to better assessments of climate projections and their errors.
- New tools for computing regional sea level change based on all these advancements.
- A web portal for distributing these advancements to scientists.
N-SLCT V2 Team Members/Investigations

- Ben Hamlington (Team Leader), JPL, “Identifying, Quantifying, and Projecting Decadal Sea Level Change”
  - Co-Is: David Bekaert, Felix Landerer, Veronica Nieves, JT Reager, Phil Thompson

- Erik Ivins, JPL, “Global interconnections of Cryosphere and Solid Earth, Sea-level Change and Ice Mass Balance”
  - Co-Is: Eric Larour, Dimitris Menemenlis, Helene Seroussi, Surendra Adhikari, Alex Gardner, David Wiese, Johan Nilsson, Nicole Schlegel, Lambert Caron, Geoff Blewitt, Bill Hammond
N-SLCT V2 Team Members/Investigations

- Regina Hock, University of Alaska Fairbanks, “21st century regional sea level projections due to land ice mass losses and geodynamic adjustments using 3-D Earth models”
  - Co-Is: Jeff Freymueller, Andy Aschwanden

- Steve Nerem, University of Colorado, “Using Satellite Measurements to Improve Regional Estimates of the Impacts of Sea Level Change”
  - Co-Is: Geoff Blewitt, John Fasullo, Bill Hammond, Jan Lenaerts, Mike Willis
N-SLCT V2 Team Members/Investigations

• Sophie Nowicki, NASA/GSFC, “Understanding current and projected sea level change with multi-satellite observations, modeling and climate system assimilation”

• Manoochehr Shirzadi, Arizona State University, “Understanding and Predicting Coastal Sea Level Variability Around the United States”
  – Co-Is: Don Chambers
N-SLCT Team Members/Investigations

• Isabella Velicogna, UC Irvine, “Quantifying and reducing uncertainty in future global and local sea-level estimates: linking physics, observations, and risk analysis to inform climate adaptation”
  – Co-Is: Robert Kopp, Robert DeConto, David Pollard, Ben Strauss, Knut Christianson
N-SLCT V2 Goals (1)

The main goal of the N-SLCT for the coming years is to produce improved projections of regional sea level change and its coastal impacts based on NASA satellite measurements and other data sets. To achieve this goal will require the following advancements:

1) Improved projections of the amount and extent of ice mass loss from Greenland and Antarctica.

2) Improved projections of sea level change driven by ocean dynamics and the addition of heat and meltwater to the oceans.

3) Improved estimates and understanding of vertical land motion and its impacts on relative sea level change, including the ability to extrapolate into the future.

4) Improved satellite-based coastal digital elevation models (DEMs), especially in developing countries.
5) Improved satellite-based estimates of present-day coastal mean sea level (currently only available at tide gauges).

6) Satellite-based statistical descriptions of sea level extremes (from storms, etc.) along the coast (again, currently only available at tide gauges) to be able to quantify the return period of inundation events (storms, etc.).

7) Improved models of how the Earth responds to changes in loading, most importantly Glacial Isostatic Adjustment (GIA).

8) Improved coastal tide models, especially in places where they are not well-constrained by tide gauges.

9) Improved projections of ice mass loss from mountain glaciers.