Supporting Trust with Provenance of the Findings of the National Climate Assessment

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4. Rensselaer Polytechnic Institute

METHOD 2015: The 4th International Workshop on Methods For Establishing Trust of (Open) Data

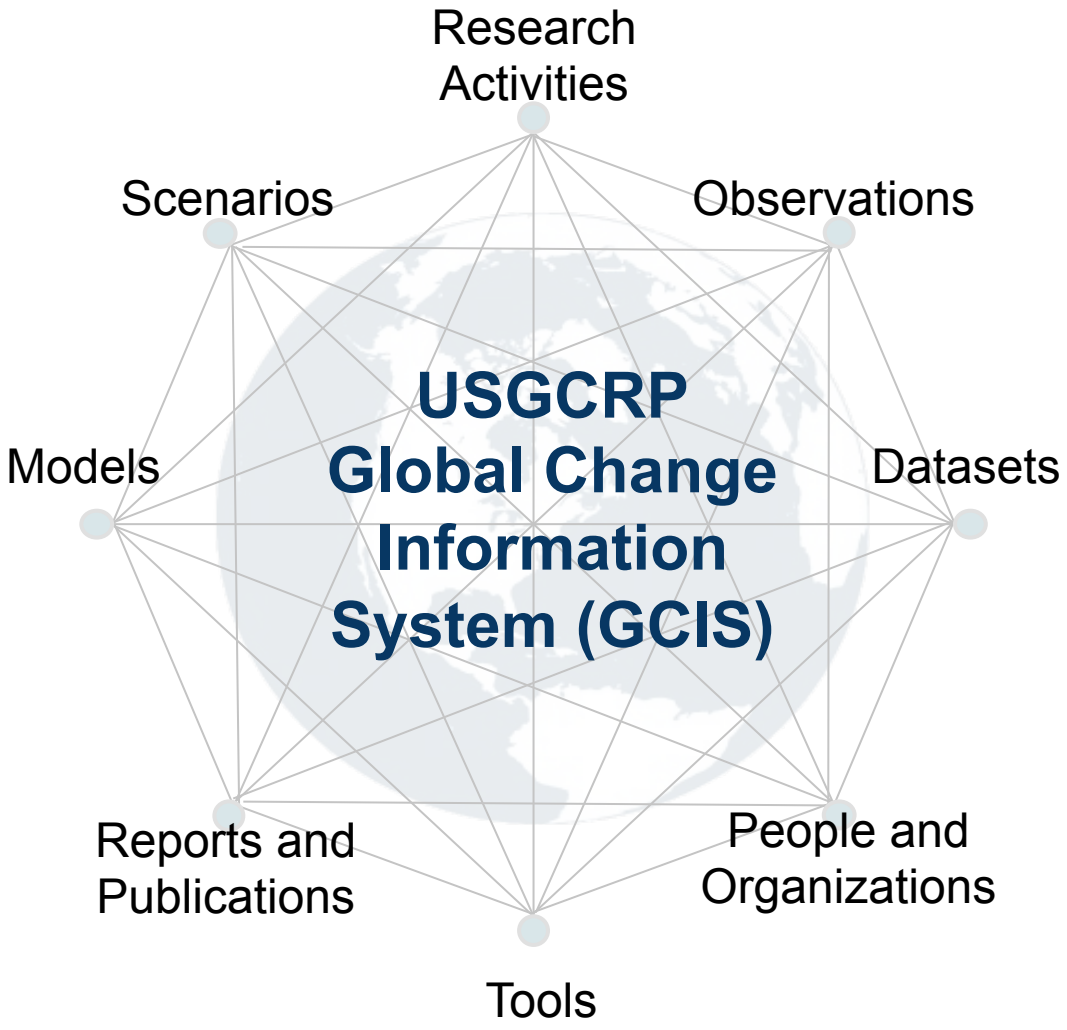
2015-10-11

U.S. Global Change Research Program

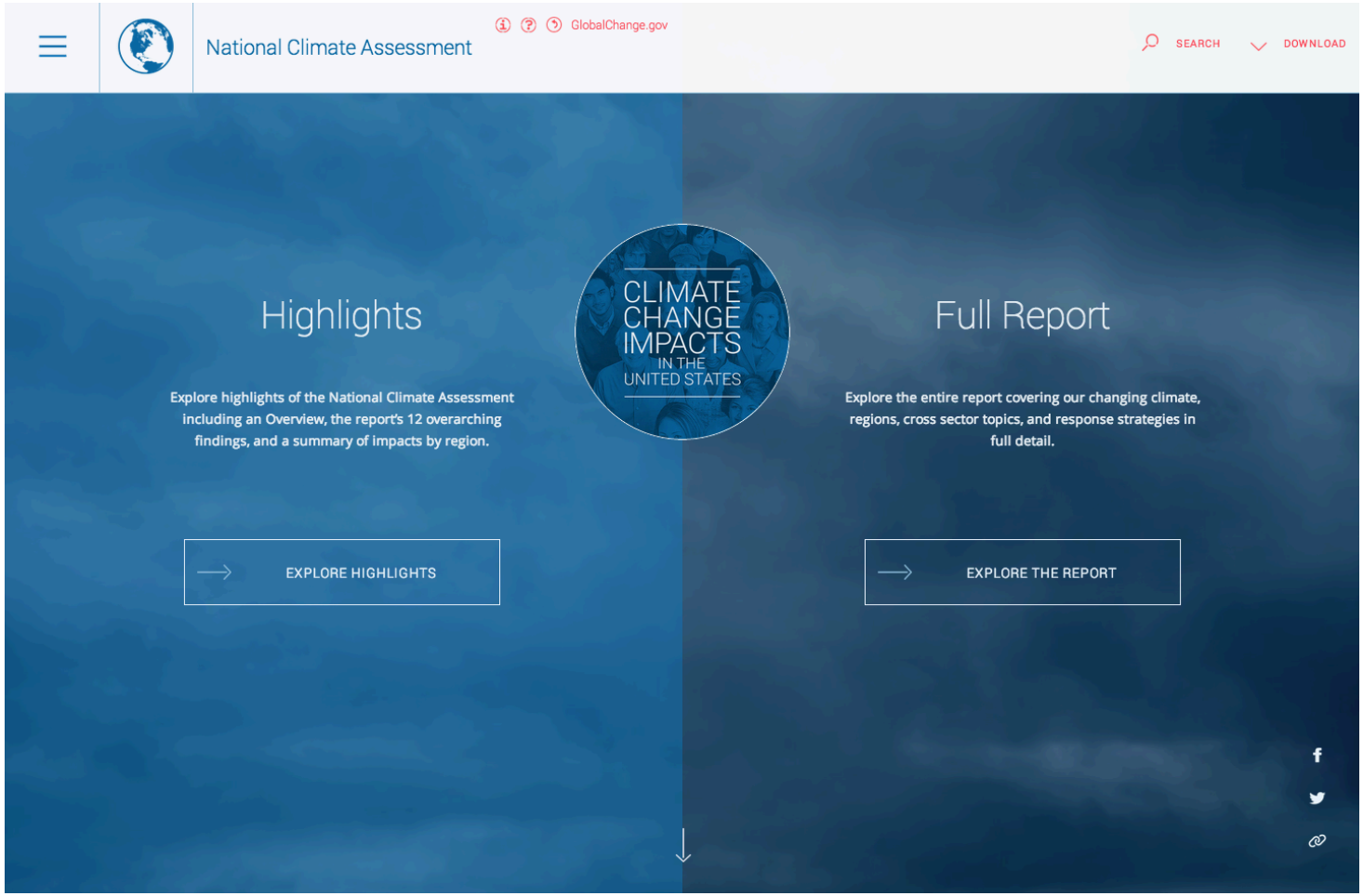
USGCRP assists the U.S. and the world to understand, assess, predict, and respond to human-induced and natural processes of global change.

Global Change Information System

GCIS **connects** global change information for scientists, decision makers and the public.

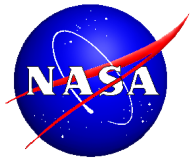


Third National Climate Assessment



http://nca2014.globalchange.gov

Third National Climate Assessment



Assessment : nca3

Climate Change Impacts in the United States: The Third National Climate Assessment

2014 assessment

National Climate Assessment and Development Advisory Committee, U.S. Global Change Research Program, Subcommittee on Global Change Research

Jerry Melillo, Terese (T.C.) Richmond, Gary Yohe

The National Climate Assessment summarizes the impacts of climate change on the United States, now and in the future. A team of more than 300 experts guided by a 60-member Federal Advisory Committee produced the report, which was extensively reviewed by the public and experts, including federal agencies and a panel of the National Academy of Sciences. The report can be explored interactively at http://nca2014.globalchange.gov.

This report has 43 chapters, 290 figures (495 images), 161 findings, 20 tables and 3,395 references

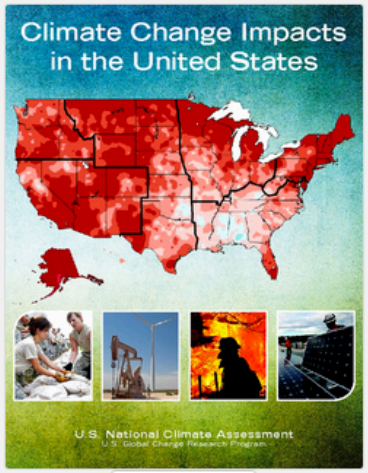
http://nca2014.globalchange.gov

DOI : 10.7930/J0Z31WJ2

Cited by indicator-global-surface-temperature, and indicator-us-surface-temperature. (references: 03be45df, 8df59d1f)

This report is cited by chapter usgcrp-ocpfy2015 chapter 1 : Introduction .

- 1 figure cites this report : figure usgcrp-ocpfy2016 2.16.
- 1 image cites this report : image 321fe08f.
- 2 reports cite this report : usgcrp-ocpfy2016, usgcrp-ocpfy2015.
- 2 reports were derived from this report : nca3-highlights, nca3-overview.



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Alternatives : JSON YAML Turtle N-Triples JSON Triples RDF+XML RDF+JSON Graphviz SVG

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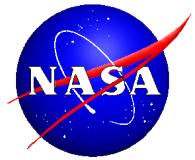
Third National Climate Assessment

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      ] .
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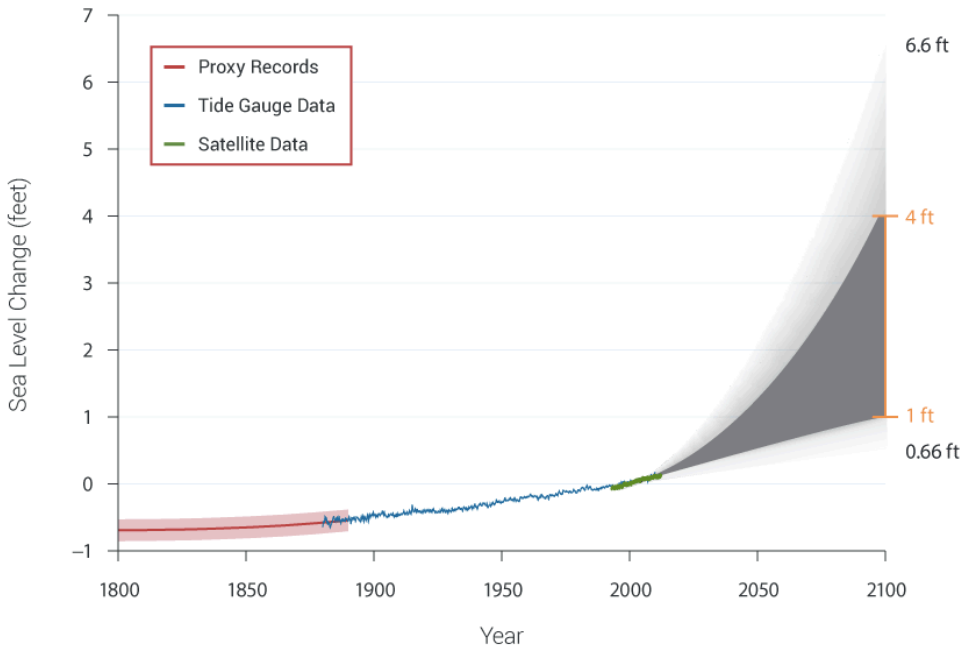
http://data.globalchange.gov/report/nca3

Credible Science

Key Message 10: Sea Level Rise

Global sea level has risen by about 8 inches since reliable record keeping began in 1880. It is projected to rise another 1 to 4 feet by 2100.

Figure 2.26: Past and Projected Changes in Global Sea Level Rise



Persistent Identifiers

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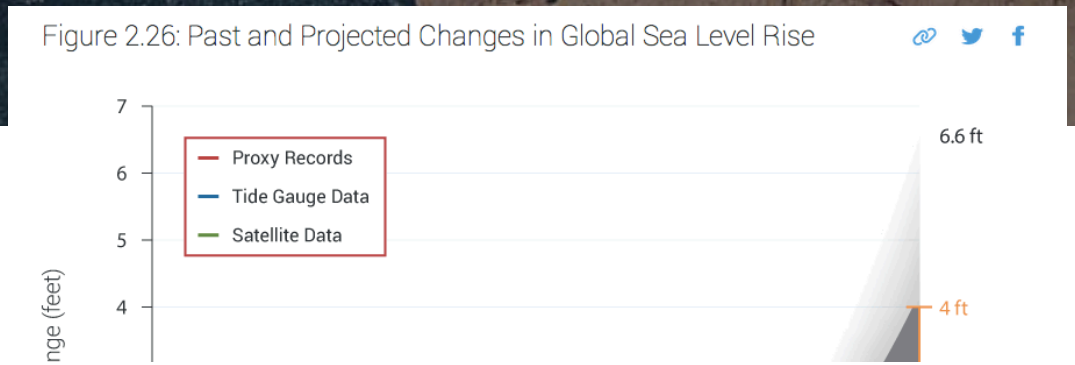

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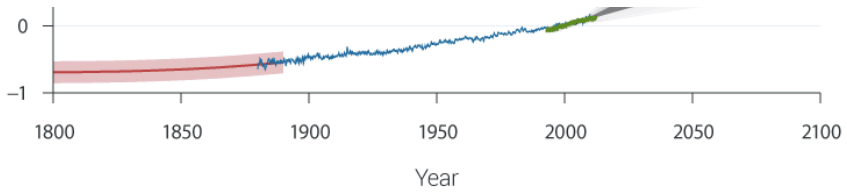


Supporting Traceable Accounts

finding 2.10 : global-sea-level-rise

Global sea level has risen by about 8 inches since reliable record keeping began in 1880. It is projected to rise another 1 to 4 feet by 2100.

This finding is from chapter 2 of Climate Change Impacts in the United States: The Third National Climate Assessment.

Process for developing key messages : Development of the key messages involved discussions of the lead authors and accompanying analyses conducted via one in-person meeting plus multiple teleconferences and email exchanges from February thru September 2012. The authors reviewed 80 technical inputs provided by the public, as well as other published literature, and applied their professional judgment. Key message development also involved the findings from four special workshops that related to the latest scientific understanding of climate extremes. Each workshop had a different theme related to climate extremes, had approximately 30 attendees (the CMIP5 meeting had more than 100), and the workshops resulted in a paper.[1] The first workshop was held in July 2011, titled Monitoring Changes in Extreme Storm Statistics: State of Knowledge.[2] The second was held in November 2011, titled Forum on Trends and Causes of Observed Changes in Heatwaves, Coldwaves, Floods, and Drought.[3] The third was held in January 2012, titled Forum on Trends in Extreme Winds, Waves, and Extratropical Storms along the Coasts.[4] The fourth, the CMIP5 results workshop, was held in March 2012 in Hawai'i, and resulted in an analysis of CMIP5 results relative to climate extremes in the United States.[1] The Chapter Author Team's discussions were supported by targeted consultation with additional experts. Professional expertise and judgment led to determining "key vulnerabilities." A consensus-based approach was used for final key message selection.

Description of evidence base : The key message and supporting text summarize extensive evidence documented in the climate science peer-reviewed literature. Technical Input reports (82) on a wide range of topics were also reviewed; they were received as part of the Federal Register Notice solicitation for public input. Nearly all studies to date published in the peer-reviewed literature agree that global sea level has risen during the past century, and that it will continue to rise over the next century. Tide gauges throughout the world have documented rising sea levels during the last 130 years. This rise has been further confirmed over the past 20 years by satellite observations, which are highly accurate and have nearly global coverage. Recent studies have shown current sea level rise rates are increasing[5][6] and project that future sea level rise over the rest of this century will be faster than that of the last 100 years (Appendix 3: Climate Science, Supplemental Message 12).[6]

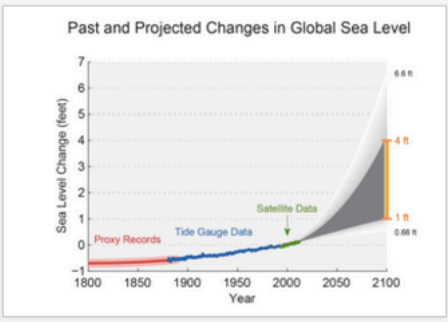
New information and remaining uncertainties : The key issue in predicting future rates of global sea level rise is to understand and predict how ice sheets in Greenland and Antarctica will react to a warming climate. Current projections of global sea level rise do not account for the complicated behavior of these giant ice slabs as they interact with the atmosphere, the ocean and the land. Lack of knowledge about the ice sheets and their behavior is the primary reason that projections of global sea level rise includes such a wide range of plausible future conditions. Early efforts at semi-empirical models suggested much higher rates of sea level rise (as much as 6 feet by 2100).[7][8] More recent work suggests that a high end of 3 to 4 feet is more plausible.[7][9][10][11][12] It is not clear, however, whether these statistical relationships will hold in the future or that they are appropriate in modeling past behavior, thus calling their reliability into question.[13] Some decision-makers may wish to consider a broader range of scenarios such as 8 inches or 6.6 feet by 2100 in the context of risk-based analysis.[14][6]

Assessment of confidence based on evidence : Given the evidence and uncertainties, confidence is very high that global sea level has risen during the past century, and that it will continue to rise over this century, with medium confidence that global sea level rise will be in the range of 1 to 4 feet by 2100.

Traceable Science

Past and Projected Changes in Global Sea Level Rise

Figure 2.26



This figure appears in chapter 2 of the Climate Change Impacts in the United States: The Third National Climate Assessment report.

Estimated, observed, and possible future amounts of global sea level rise from 1800 to 2100, relative to the year 2000. Estimates from proxy data[1] (for example, based on sediment records) are shown in red (1800-1890, pink band shows uncertainty), tide gauge data are shown in blue for 1880-2009,[2] and satellite observations are shown in green from 1993 to 2012.[3] The future scenarios range from 0.66 feet to 6.6 feet in 2100.[4] These scenarios are not based on climate model simulations, but rather reflect the range of possible scenarios based on other scientific studies. The orange line at right shows the currently projected range of sea level rise of 1 to 4 feet by 2100, which falls within the larger risk-based scenario range. The large projected range reflects uncertainty about how glaciers and ice sheets will react to the warming ocean, the warming atmosphere, and changing winds and currents. As seen in the observations, there are year-to-year variations in the trend. (Figure source: NASA Jet Propulsion Laboratory).

When citing this figure, please reference J. Willis, Jet Propulsion Laboratory.

Free to use with credit to the original figure source.

References :

1 Climate related sea-level variations over the past two millennia (e679d754)
2 Sea-Level Rise from the Late 19th to the Early 21st Century (94a8514e)
3 Estimating Mean Sea Level Change from the TOPEX and Jason Altimeter Missions (7b7ffcb0)
4 Global Sea Level Rise Scenarios for the United States National Climate Assessment. NOAA Tech Memo OAR CPO-1 (d8089822)

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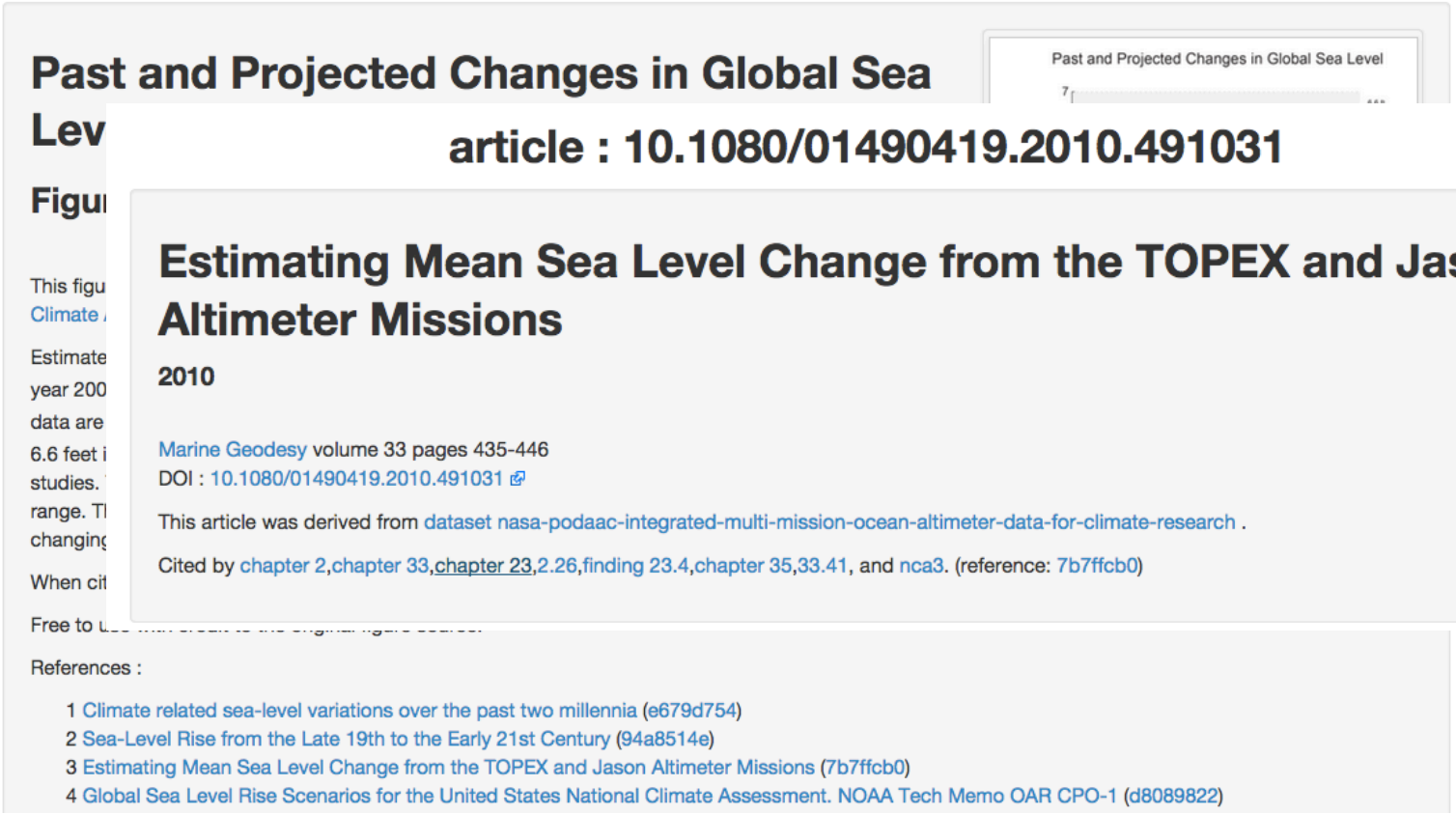

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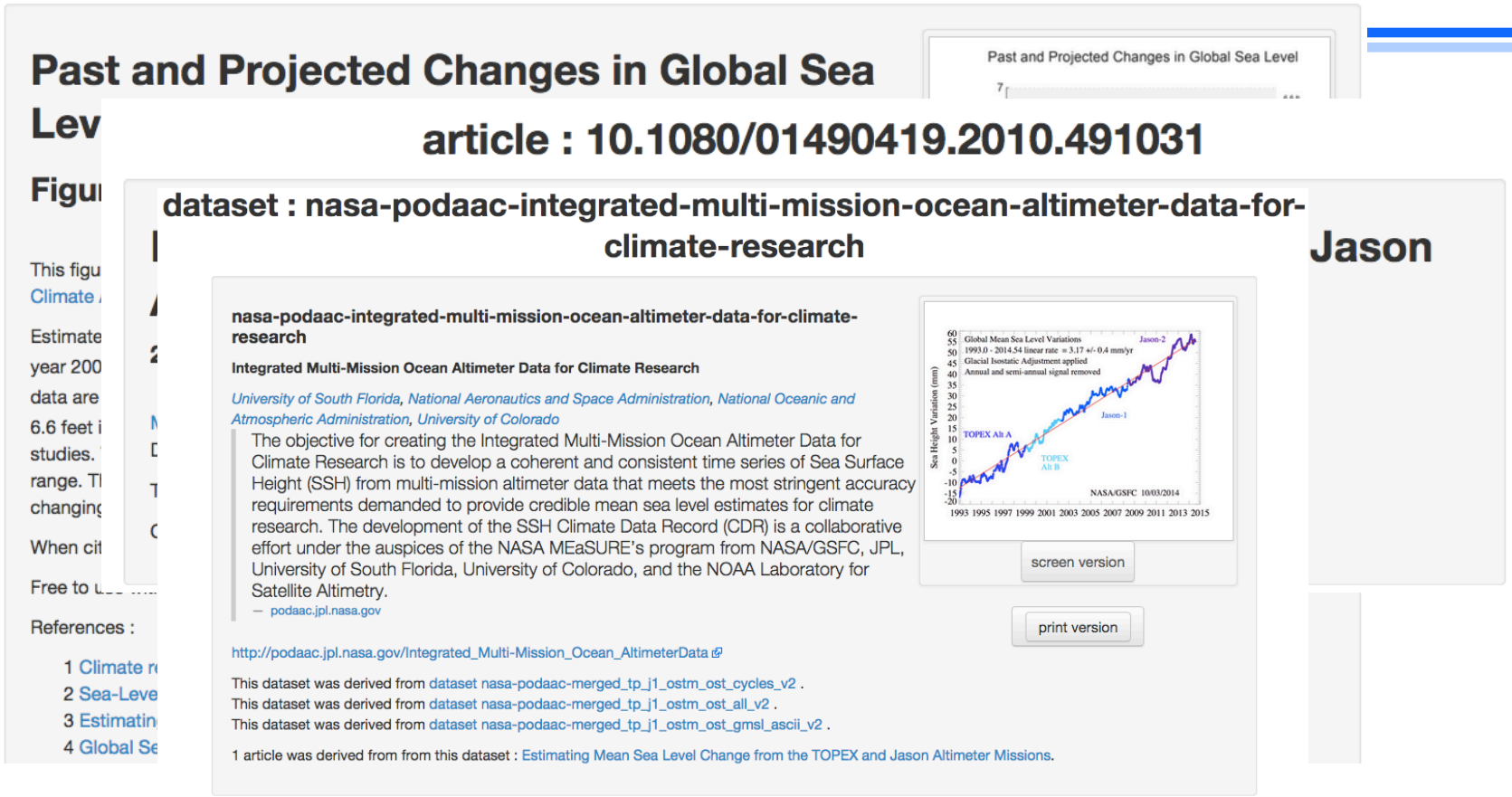

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Past and Projected Changes in Global Sea Level

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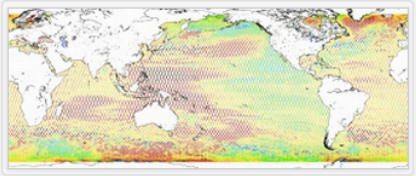
Integrated Multi-Mission Ocean Altimeter Data for Climate Research Version 2

NASA JPL Physical Oceanography Distributed Active Archive Center



podaac.jpl.nasa.gov

> This dataset contains along track geo-referenced Sea Surface Height Anomalies (SSHA) from TOPEX/Poseidon, Jason-1 and OSTM/Jason-2 (depending on time period) merged into a single mean reference orbit. All biases and cross-calibrations have been applied to the data so SSHA are consistent between satellites to form a single climate data record. Altimeter data from the multi-mission Geophysical Data Records (GDRs) are interpolated to a common reference orbit facilitating direct time series analysis of the geo-referenced SSH. The data are in netCDF format in an array based on 3-dimensions (rev#, index, cycle) that permits direct access of individual locations at specific times (i.e., temporal and spatial sub-sampling). Each file consists of one cycle of data, which is approximately 10 days long. Cycle 001 coincides with cycle 001 of TOPEX/Poseidon (September 25-October 3, 1992) and is presently updated to cycle 748, which coincides with OSTM/Jason-2 cycle 166 (January 3-13, 2013).
> — podaac.jpl.nasa.gov

http://podaac.jpl.nasa.gov/dataset/MERGED_TP_J1_OSTM_OST_CYCLES_V2

Identified by : MERGED_TP_J1_OSTM_OST_CYCLES_V2

This dataset was released on February 28, 2013.

The time range for this dataset starts at September 25, 1992 (04:46 AM).

The spatial range for this dataset is -66° to 66° latitude, and 0° to 360° longitude.

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This dataset uses data from an instance of the poseidon-2 instrument on the jason-2 platform.

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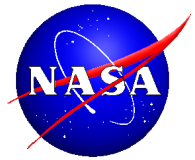

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Instrument : poseidon-3

Positioning Ocean Solid Earth Ice Dynamics Orbiting Navigator (Single frequency solid state radar altimeter)

Centre National D'études Spatiales

> The Poseidon-3 radar altimeter is the main instrument on the Jason-2 mission. Derived from the Poseidon-1 altimeter on TOPEX/Poseidon and the Poseidon-2 on Jason-1, it measures sea level, wave heights and wind speed.
> — sealevel.jpl.nasa.gov

sealevel.jpl.nasa.gov

Platforms :

jason-2

Also known as :

- instrumentID 829 (ceos lexicon)
- Instrument POSEIDON-3 (ceos lexicon)
- Sensor POSEIDON-3 (podaac lexicon)

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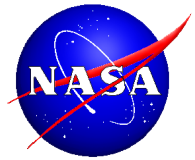

Past and Projected Changes in Global Sea Lev

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Instrument : poseidon-3

Platform : jason-2

Ocean Surface Topography Mission

Centre National D'études Spatiales , National Aeronautics and Space Administration, National Oceanic and Atmospheric Administration, European Organisation for the Exploitation of Meteorological Satellites

June, 2008 to October, 2017

Jason-2 is a follow-on satellite to the joint CNES/NASA oceanography mission Jason (or Jason-1, with a launch Dec. 7, 2001). Jason-1, in turn is a follow-on mission of TOPEX/Poseidon, the ocean surface topography since its launch in 1992 (operations ceased on Oct. 9, 2005).

— directory.eoportal.org

directory.eoportal.org

http://sealevel.jpl.nasa.gov/mission/ostm.html

Instrument	Datasets
Doppler Orbitography and Radio-positioning Integrated by Satellite-NG	0
Laser Retroreflector Array	0
Global Positioning System Payload	0
Advanced Microwave Radiometer	14
Turbo-Rogue Space Receiver	0
Positioning Ocean Solid Earth Ice Dynamics Orbiting Navigator (Single frequency solid state radar altimeter)	15
JASON Microwave Radiometer	0

Also known as :

- missionID 419 (ceos lexicon)
- Mission OSTM (Jason-2) (ceos lexicon)
- Platform OSTM/Jason-2 (podaac lexicon)

References :

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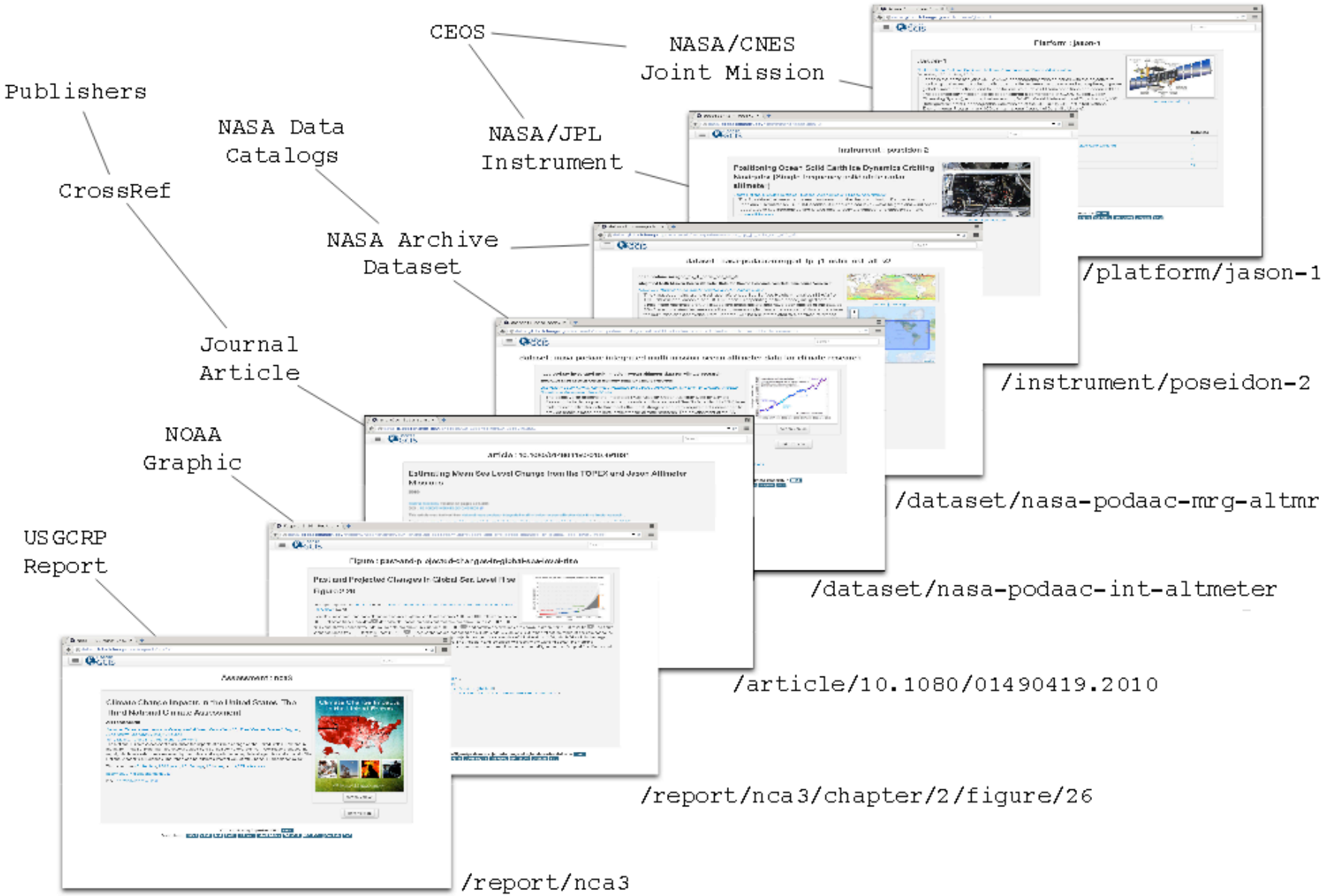
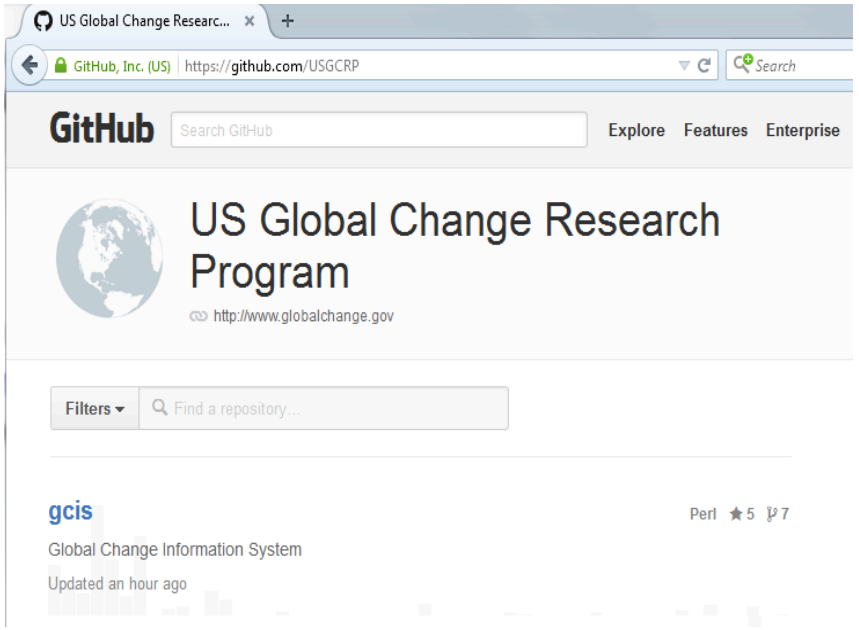


Contributing to GCIS

Public SPARQL Endpoint
https://data.globalchange.gov/sparql

Well defined public API
https://data.globalchange.gov/api

Open Source Development
https://github.com/USGCRP/gcis



Developer mailing list
https://groups.google.com/a/usgcrp.gov/forum/#!forum/gcis-api-users-group

Adding more content and linking to more global change resources, contributions welcome!

Thank You!

Curt.Tilmes@nasa.gov