

Sea Level Rise in Connecticut

James O'Donnell

Connecticut Institute for Resilience and Climate Adaptation

and

Department of Marine Sciences

University of Connecticut

UConn



Intergovernmental Panel on Climate Change (IPCC)

Established 1988 by United Nations Environment Program

2001 Third Assessment Report (TAR)

Climate Change 2001: The Scientific Basis

Climate Change 2001: Impacts, Adaptation, and Vulnerability

Fourth Assessment Report (AR4)

Climate Change 2007: The Physical Science Basis;

Climate Change 2007: Impacts, Adaptation and Vulnerability;

Climate Change 2007: Mitigation of Climate Change;

Climate Change 2007: Synthesis Report).

Nobel Peace Prize

“efforts to build up and disseminate greater knowledge of man-made climate change, and to lay the foundations for the measures that are needed to counteract such change”

Fifth Assessment Report (AR5)

Climate Change 2014: Impacts Adaptation and Vulnerability Climate Change 2014: Mitigation of Climate Change

Berkeley Earth Project

[New York Times](#) on 28 July 2012,

Average global land temperatures had increased by 2.5 °F (1.4 °C) in 250 years, with the increase in the last 50 years being 1.5 °F (0.8 °C), and it seemed likely that this increase was entirely due to human caused [greenhouse gas](#) emissions.

Call me a converted skeptic. Three years ago I identified problems in previous climate studies that, in my mind, threw doubt on the very existence of global warming. Last year, following an intensive research effort involving a dozen scientists, I concluded that global warming was real and that the prior estimates of the rate of warming were correct. I'm now going a step further: Humans are almost entirely the cause. [\[13\]](#)

UConn



Connecticut

- Governor's Council on Climate Change
- CO₂ reduction target of 80% below 2001 levels by 2050
- Include Sea Level Rise projections in coastal planning
- Develop a Statewide Resilience Roadmap based on best climate impact research (Executive Order 50)

Elias Loomis



Born August 7, 1811
[Willington, Connecticut](#), United States

Died August 15, 1889
[New Haven, Connecticut](#), United States

Citizenship United States

Nationality United States

Fields Mathematics, [Terrestrial Magnetism](#)

Institutions [Western Reserve College](#), [New York University](#), [Yale College](#)

H. A. Newton



Hubert Anson Newton, around 1879

Born 19 March 1830
[Sherburne, New York](#)

Died 12 August 1896 (aged 66)
[New Haven, Connecticut](#), [USA](#)

Nationality [American](#)

Fields [Astronomer](#) and [mathematician](#)

Institutions [Yale University](#)

Alma mater [Yale University](#)

Academic advisors [Michel Chasles](#)

Doctoral students [E. H. Moore](#), [Josiah Willard Gibbs](#), [Charles Newton Little](#), [Arthur W. Wright](#)

Known for [Science of meteors](#)

Notable awards [Smith gold medal](#)

Signature

H. A. Newton

ART. V.—ON THE MEAN TEMPERATURE, AND ON THE FLUCTUATIONS OF TEMPERATURE, AT NEW HAVEN, CONN., Lat. $41^{\circ} 18' N.$, Long. $72^{\circ} 55' W.$ of Greenwich; BY PROFESSORS ELIAS LOOMIS AND H. A. NEWTON.

In July, 1862, the Connecticut Academy of Arts and Sciences appointed a committee, consisting of Professors Elias Loomis and H. A. Newton, to reduce the meteorological observations which for a series of years had been made in the name of the Academy, and also to incorporate with them any other reliable observations made in New Haven. The committee have discharged the duty imposed upon them, so far as relates to the observations of temperature, and now present the results of their labors.*

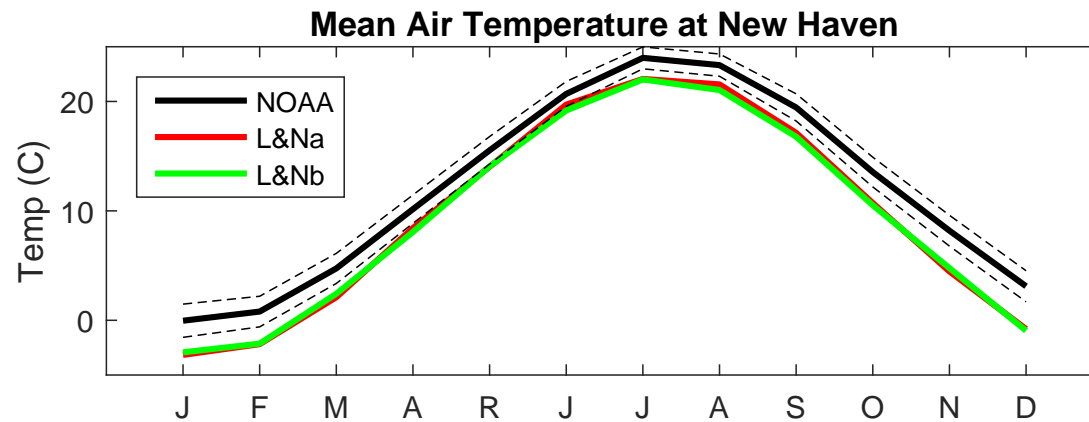
Month.	Max.	Date.		Observers.	Min.	Date.		Observers.	Rank
		Year.	Day.			Year.	Day.		
Jan.,	64	1833	5	Dr. Alfred S. Monson.	-24	1835	5	{ Dr. Alfred S. Monson, Rodney Burton.	8
Feb.,	68	1810	26	Pres. Jeremiah Day.	-16	1855	7	Rodney Burton.	8.
March.	76	1845	28	Col. Enos Cutler.	-9	1835	2	{ Dr. Alfred S. Monson, Rodney Burton.	8.
April,	85	1844	15	Col. Enos Cutler.	11	1847	1	Col. Enos Cutler.	7.
May,	94	1845	12	Col. Enos Cutler.	27	1837	2	Edward C. Herrick.	6.
June,	102	1864	26	Prof. Elias Loomis.	35	1787	2	Pres. Ezra Stiles.	6.
July,	101	1778	3	Pres. Jeremiah Day.	44	1816	7	Pres. Jeremiah Day.	5.
Aug.,	98	1780	6	Pres. Ezra Stiles.	39	1814	13	Pres. Jeremiah Day.	5.
Sept.,	92	1782	5	Prof. Elias Loomis.	27	1834	29	Dr. Alfred S. Monson.	6.
Oct.,	83	1809	1	Pres. Ezra Stiles.	19	1834	30	Dr. Alfred S. Monson.	6.
Nov.,	74	1856	4	Rev. David L. Ogden.	2	1836	28	Dr. Alfred S. Monson.	7.
Dec.,	68	1788	5	Pres. Ezra Stiles.	-11	1786	29	Pres. Ezra Stiles.	7.
Year,	102	1805	2	Pres. Jeremiah Day.	-24	1831	16	Dr. Alfred S. Monson	12.
		1809	26	Pres. Jeremiah Day.				{ Dr. Alfred S. Monson Rodney Burton.	

In order to determine whether the mean temperature of New Haven has changed since the time of the earliest recorded observations, we have divided the entire series of observations into two groups, the first embracing the observations down to 1820, forming a series of 41 years; the second embracing the observations since 1820, forming a series of 45 years. The mean temperature of each month according to the two series of observations is shown in the following table; the mean of the observations being reduced to the true mean temperature by applying the correction from the table on page 232.

Months.	First series.	Second series.	Difference.	Months.	First series.	Second series.	Difference.
January,	26.31	26.73	+0.42	July,	71.70	71.62	-0.08
February,	28.08	28.16	+0.08	August,	70.80	69.88	-0.92
March,	35.80	36.36	+0.56	September,	62.84	62.20	-0.64
April,	47.17	46.53	-0.64	October,	51.28	50.93	-0.35
May,	57.26	57.30	+0.04	November,	40.04	40.59	+0.55
June,	67.47	66.51	-0.96	December,	30.56	30.29	-0.27

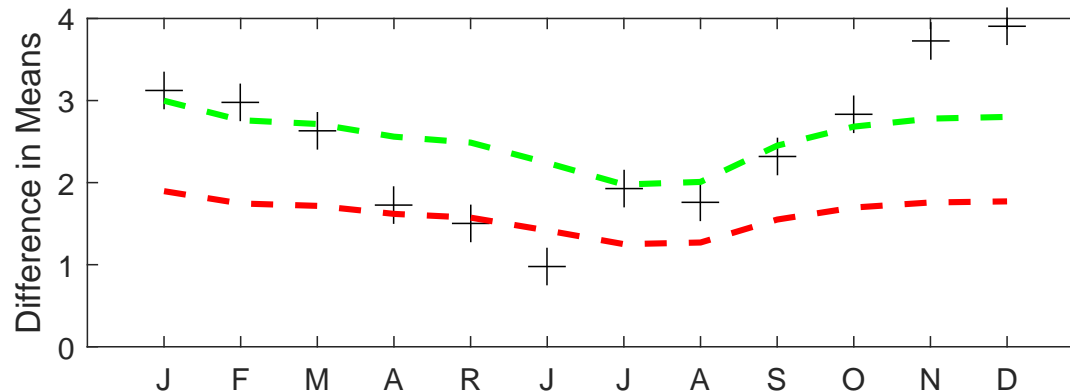
These differences are generally small, with repeated changes of sign; which seems to indicate that they are mainly due to those irregular causes which render the mean temperature of a given

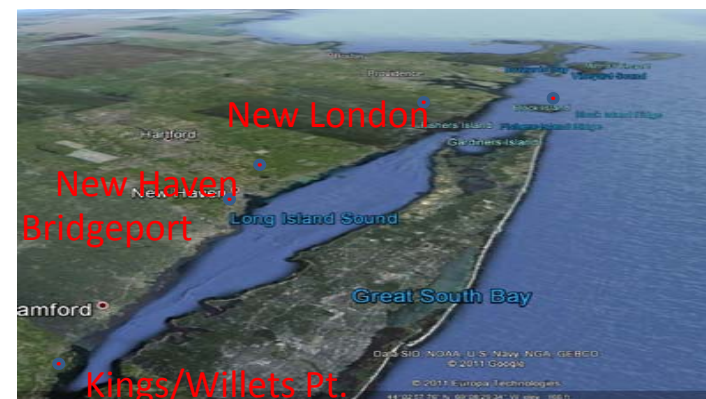
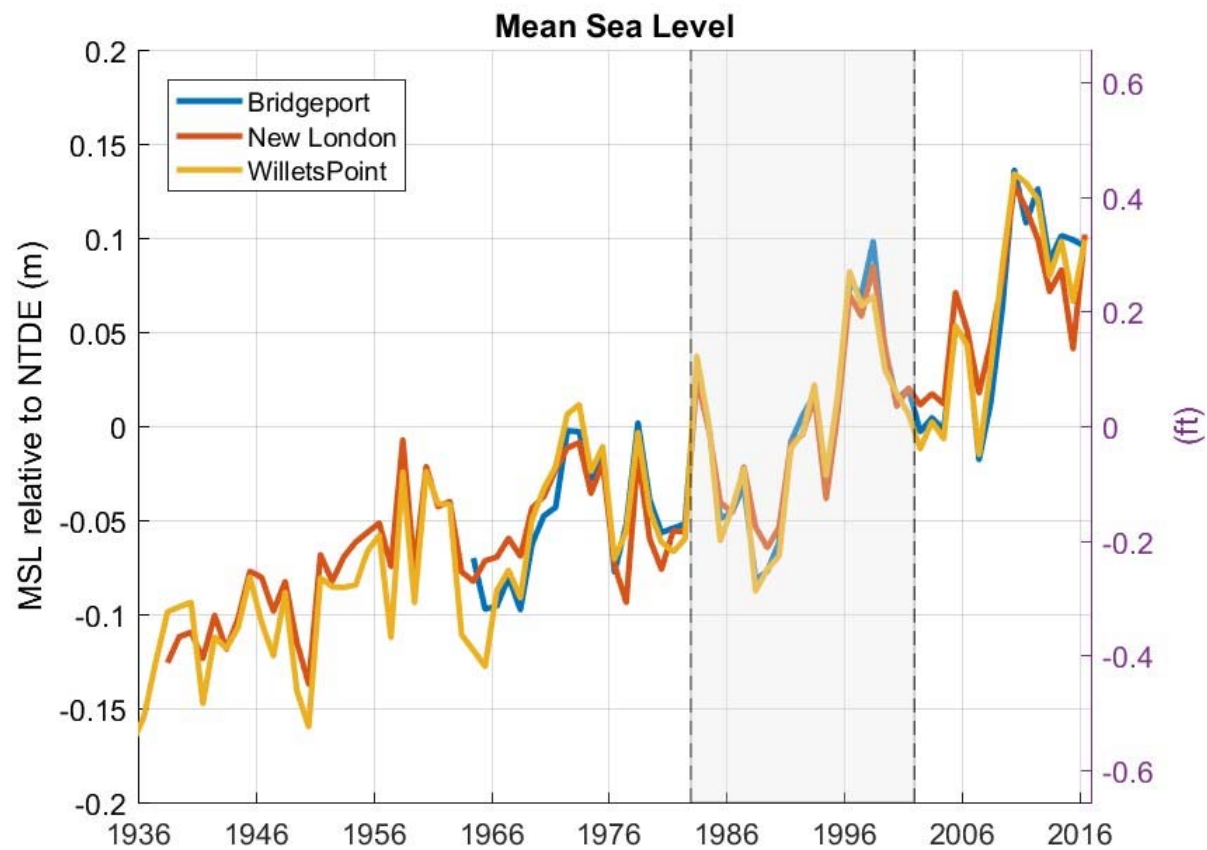
Air Temperature



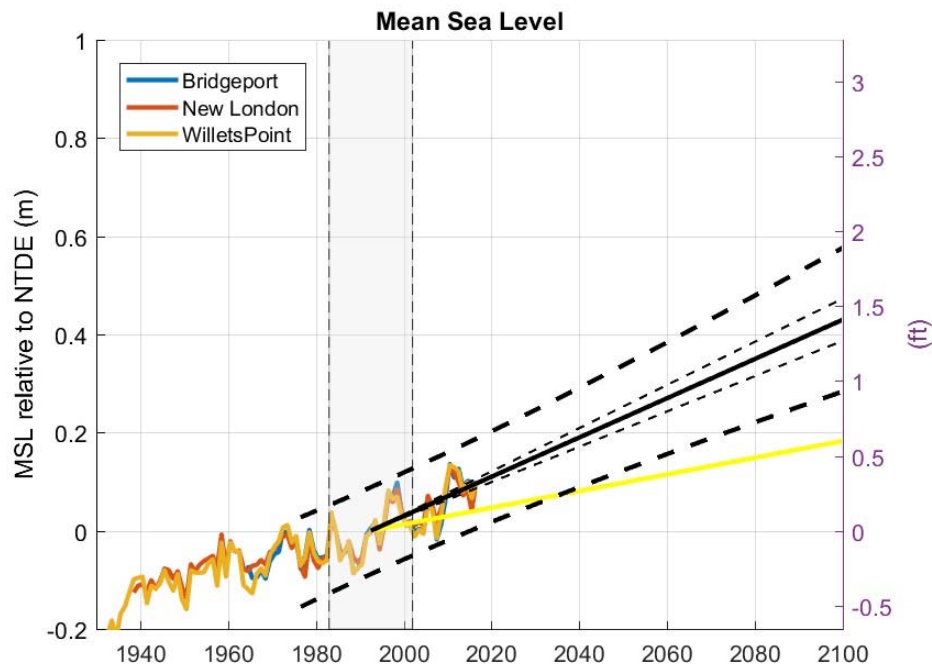
Red: Loomis and Newton 1779-1820
Green: Loomis and Newton 1820-1865

Black: Tweed-New Haven Airport

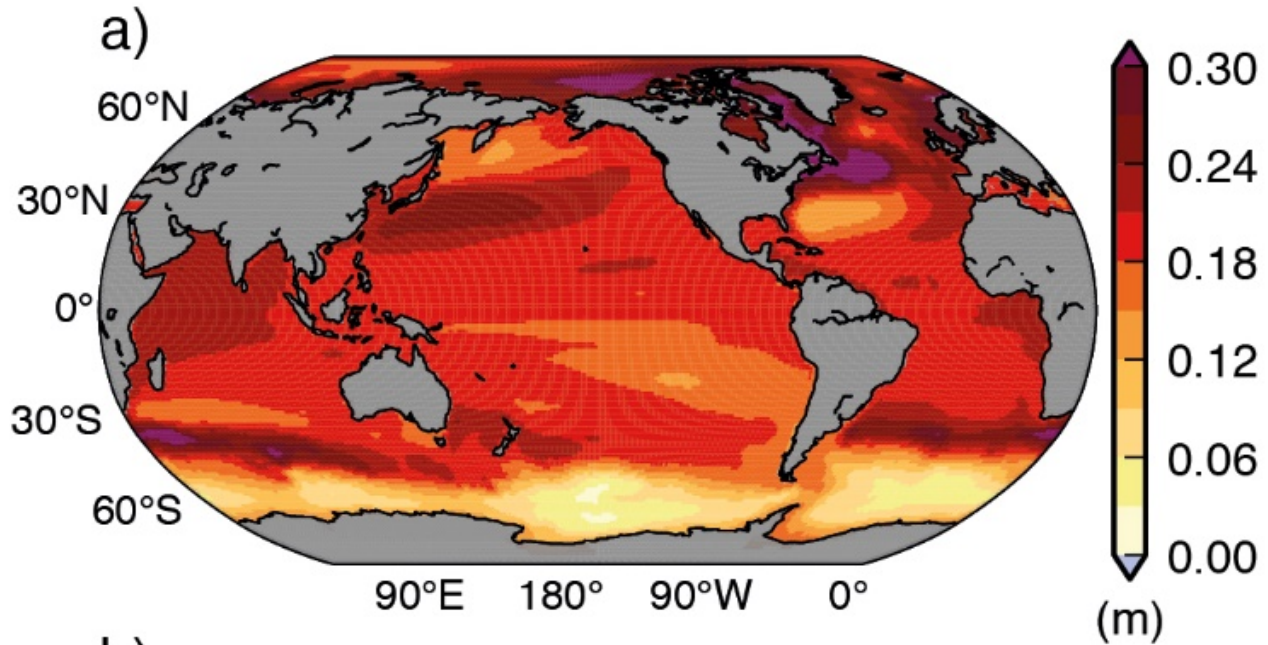




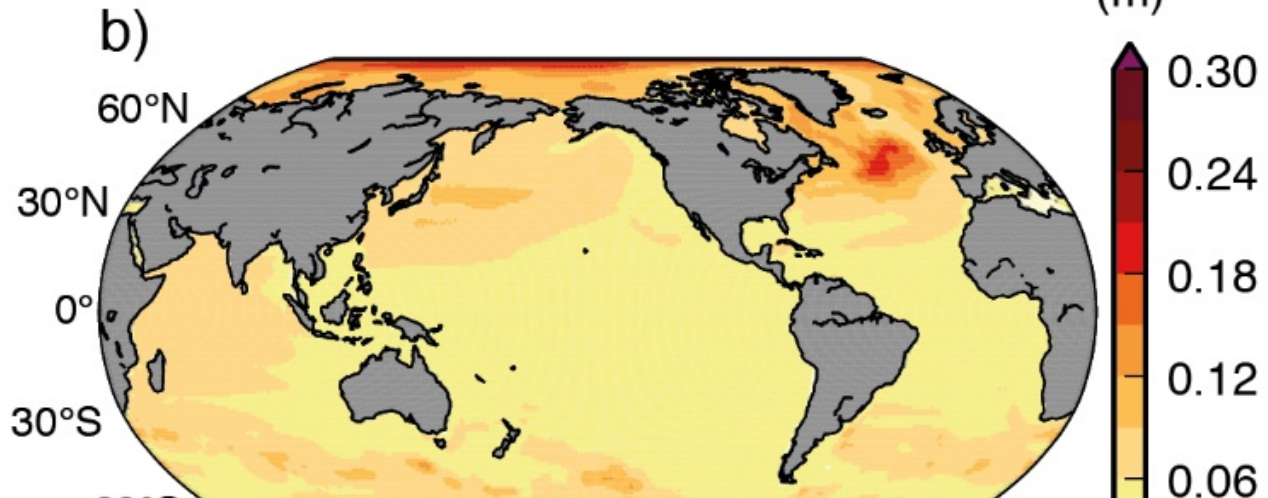
Summary of Results

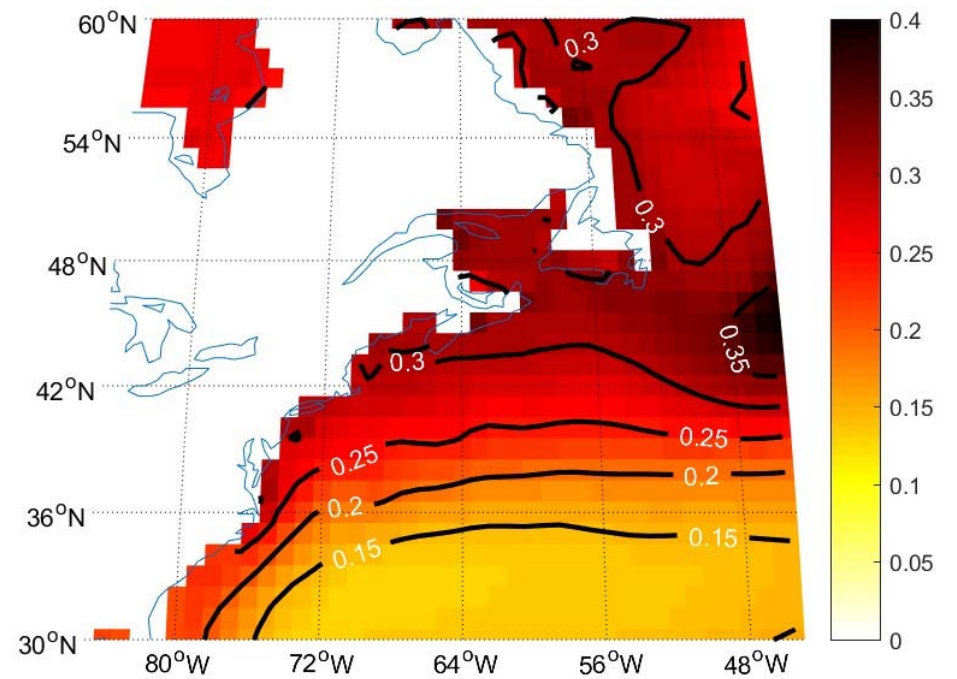
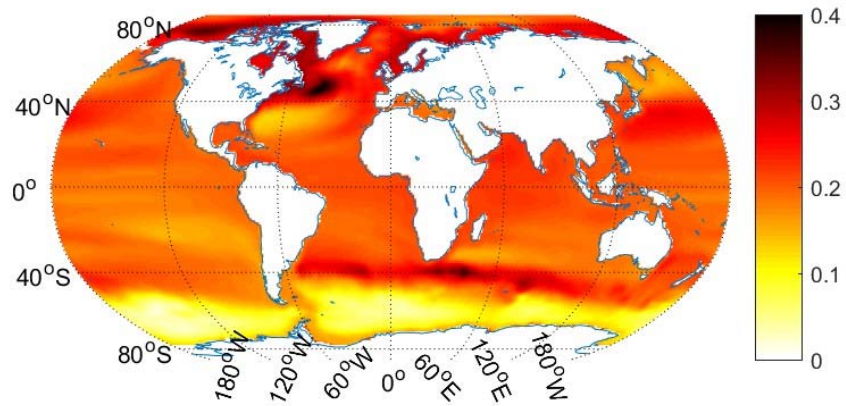


Year	Mean (m)	Upper 95% (m)	NOAA (m)	Mean (ft)	Upper 95% (ft)	NOAA (ft)
2020	0.15	0.25	0.06	0.5	0.81	0.21
2030	0.19	0.29	0.08	0.63	0.96	0.27
2040	0.23	0.34	0.10	0.76	1.11	0.32
2050	0.27	0.39	0.12	0.89	1.27	0.38
2070	0.31	0.43	0.13	1.02	1.42	0.43
2080	0.35	0.48	0.15	1.15	1.58	0.49
2090	0.39	0.53	0.17	1.29	1.74	0.55
2100	0.43	0.58	0.18	1.42	1.9	0.60



Sea Level change
by 2100
from IPCC (2013)





UConn



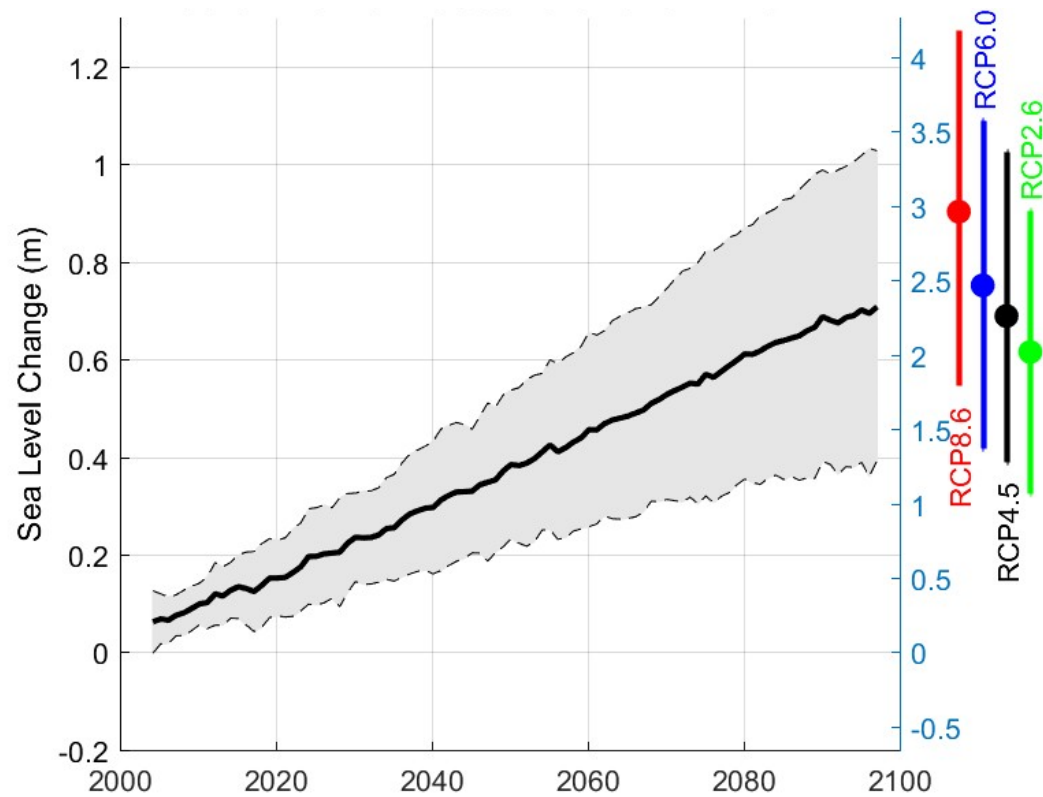
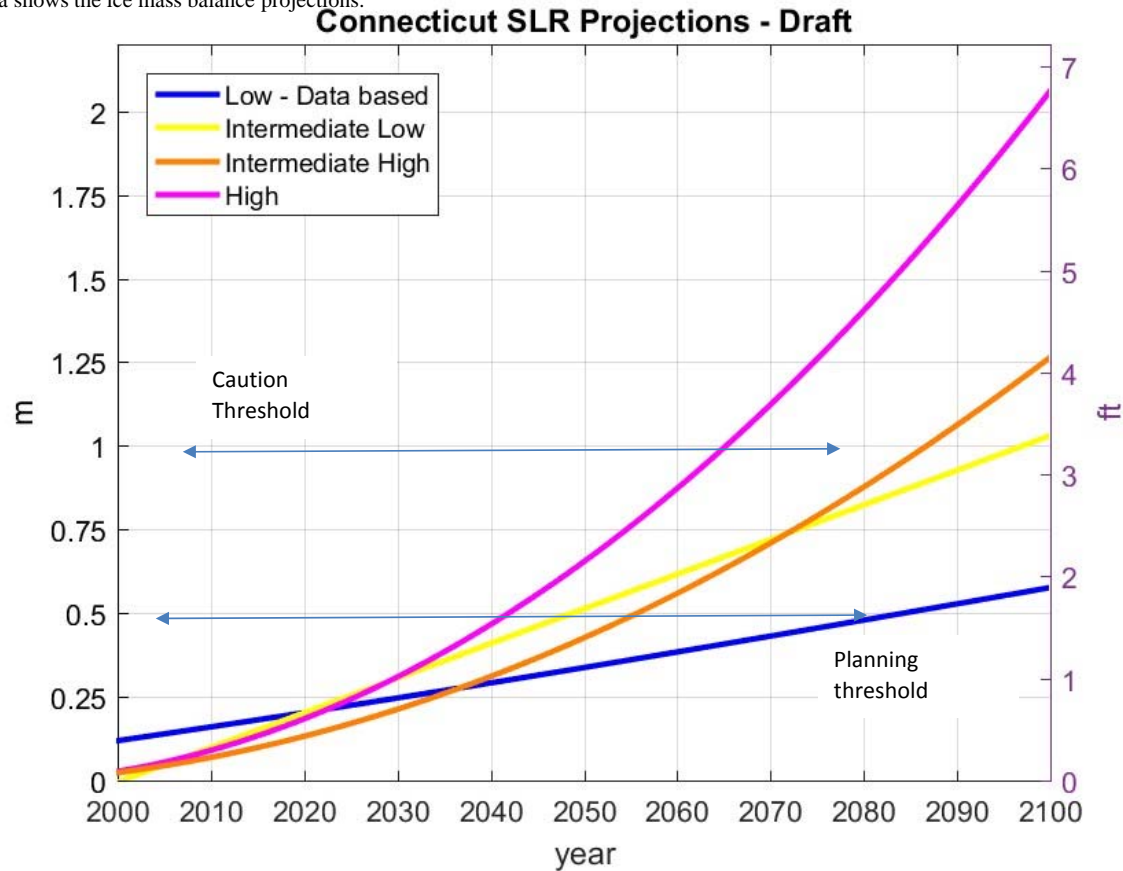


Figure 12. Sea level projection from IPCC (2013) for RCP 4.5 at the cell shown by the green cell in Figure 11 with the rate of vertical land motion added are shown by the solid black line. The 5 to 95% confidence interval is represented by the grey stripe. On the right of the figure the average sea level, and 5 to 95% range, for the interval 2090 and 2100 is shown for the 4 RCPs in IPCC (2013).

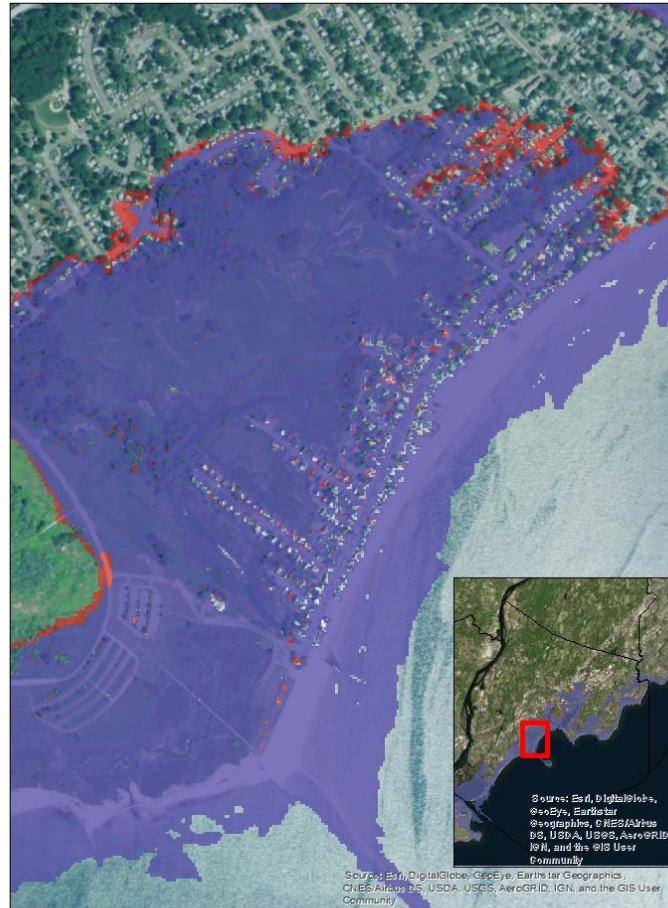
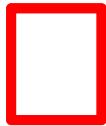
Figure 1. Sea level rise projections for Connecticut based on local tide gage observations (blue), the IPCC (2013) RPC 4.5 model simulations near Long Island Sound (yellow line), the semi-empirical model predictions are in orange and the magenta shows the ice mass balance projections.



20in/50cm at 2050

Decadal Review

Alert people about the prospect of 100cm by 2100



Sources: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

UConn



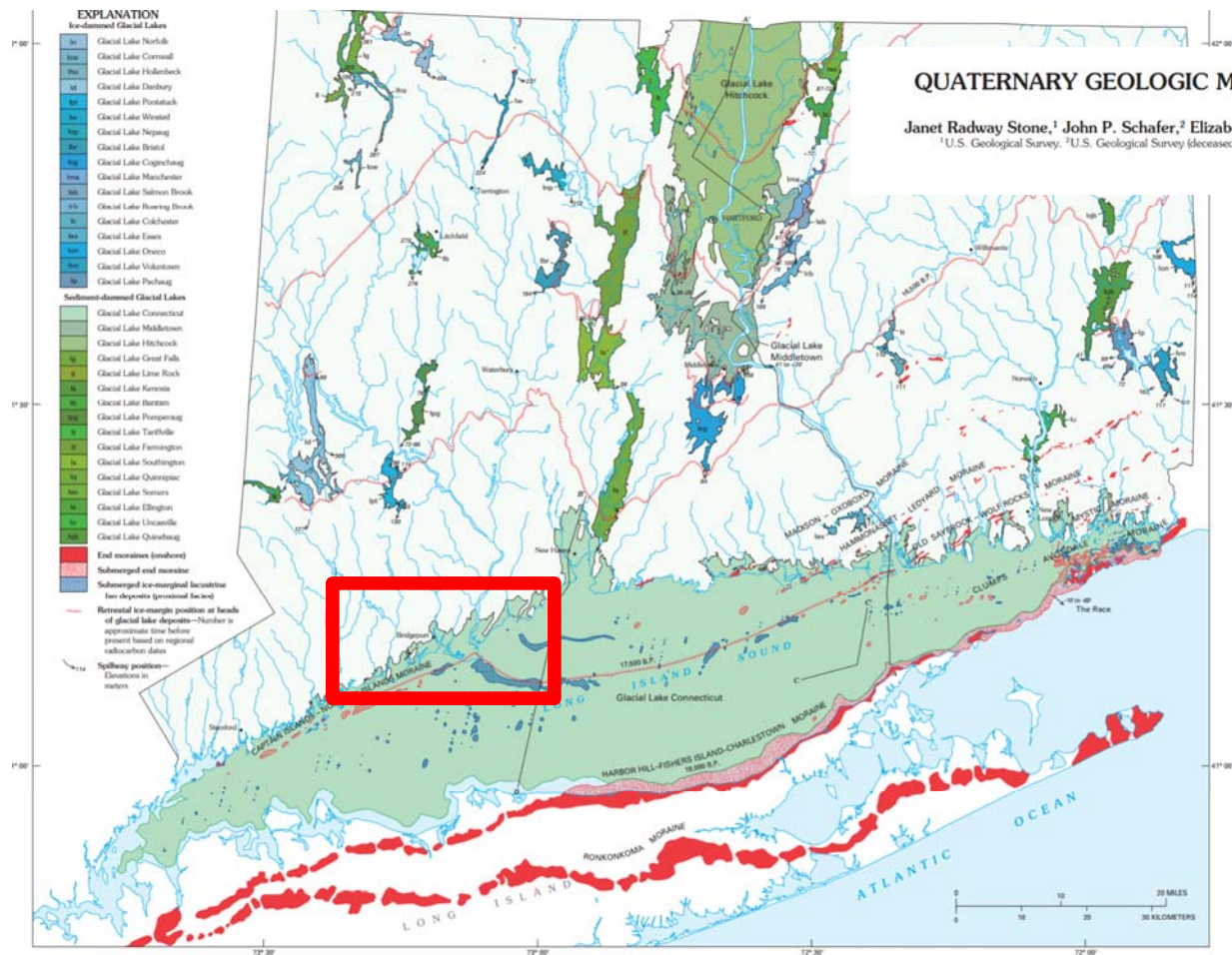


Figure 4.—Major glacial lakes in Connecticut and selected ice-margin positions during late Wisconsin deglaciation. See discussion of glacial-lake history in accompanying text. The distribution of the Ronkonkoma moraine is from Fuller (1914).

QUATERNARY GEOLOGIC MAP OF CONNECTICUT AND LONG ISLAND SOUND BASIN

By

Janet Radway Stone,¹ John P. Schafer,² Elizabeth Haley London,¹ Mary L. DiGiacomo-Cohen,³ Ralph S. Lewis,⁴ and Woodrow B. Thompson⁵

¹U.S. Geological Survey, ²U.S. Geological Survey (deceased), ³Long Island Sound Resource Center, ⁴Connecticut Geological and Natural History Survey (retired), ⁵Maine Geological Survey.

2005

UConn

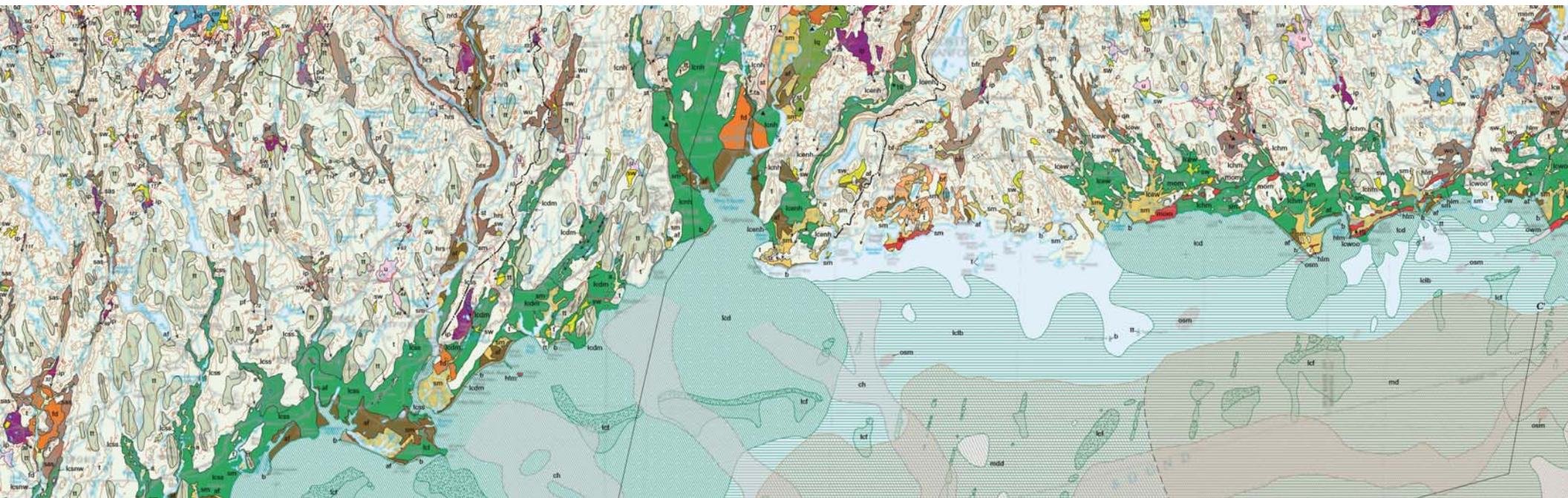


<https://coastfieldguides.com/2015/07/21/glacial-lake-connecticut-map/>



UConn





UConn

