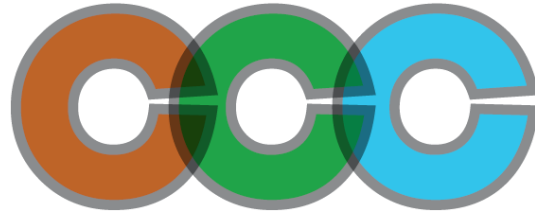


CONSEJO DE CAMBIOS CLIMÁTICOS



CLIMATE CHANGE COUNCIL
PUERTO RICO



V REUNIÓN CUMBRE

ISLA VERDE, PUERTO RICO

28 MARZO 2014

Declaración anual de la OMM sobre el estado del clima pone de relieve fenómenos meteorológicos extremos (2014)

El año 2013 fue, junto a 2007, el sexto año más caluroso desde mediados del siglo XIX.

El informe revela que alrededor del 93% del exceso de calor atrapado en la atmósfera entre 1971 y 2010 fue absorbido por los océanos.

Antes del año 2000, la mayor parte del calor estaba atrapado entre los 700 metros de profundidad y la superficie. Desde entonces el calor se ha almacenado hasta los 2,000 metros, afectando procesos oceánicos, climáticos y vida marina.

IV Reunión Cumbre sobre Cambios Climáticos 2013

AGENDA

- 8:30 AM - 9:00 AM REGISTRO
- 9:00 AM - 9:30 AM BIENVENIDA
Hon. Carmen Guerrero Pérez, Secretaria
Departamento de Recursos Naturales y Ambientales
- 9:30 AM - 10:00 AM Ernesto L. Díaz, Director
Programa de Manejo de la Zona Costanera
Informe del Consejo de Cambios Climáticos
- 10:00 AM - 10:25 AM Dr. Ángel R. Torres Valcarcel (Purdue University)
El impacto de la urbanización o desarrollo urbano en el clima de Puerto Rico.
- 10:25 AM - 10:50 AM Dr. Jaime A. Collazo / Dr. Adam J. Terando
North Carolina State University
Developing high-resolution island-centric projections of ecologically-relevant climate variables for Puerto Rico and the US Caribbean: a foundation for adaptation strategies.
- 10:50 AM - 11:10 AM COFFEE BREAK
- 11:10 AM - 11:35 AM Dr. Ricardo J. Colón Rivera (Texas A&M University)
Uso del agua e intrusión del mar en el Bosque de Pterocarpus de la Reserva Natural de Humacao.
- 11:35 AM - 12:00 M Dra. Jennifer Santos Hernández (Universidad de Puerto Rico, Recinto de Río Piedras)
Lessons Learned on Social Vulnerability in Puerto Rico: Disaster Risk Management and Climate Change.
- 12:00 M - 1:00 PM ALMUERZO

PRCCC

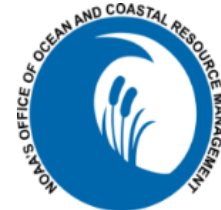




NOAA Coastal Services Center
LINKING PEOPLE, INFORMATION, AND TECHNOLOGY

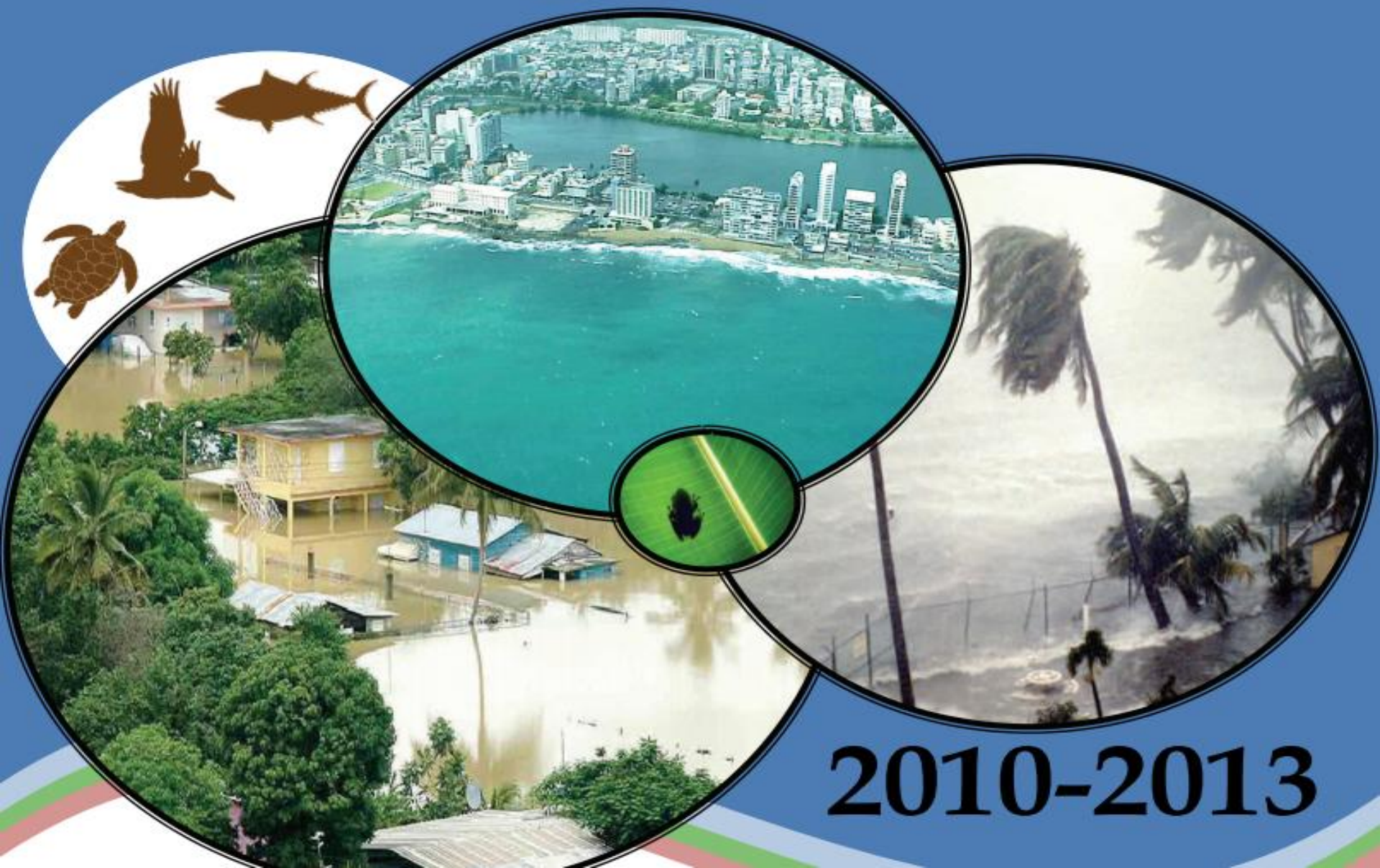


Fideicomiso de Conservación de Puerto Rico
Conservation Trust of Puerto Rico



Estado del Clima de Puerto Rico

Evaluación de vulnerabilidades socio-ecológicas en un clima cambiante



2010-2013



FINAL REPORT

Quantifying Key Drivers of Climate Variability and Change for Puerto Rico and the Caribbean

**Katharine Hayhoe, Texas Tech
University (PI)**

With contributions from Jung-Hee
Ryu, Anne Stoner, and the TTU High
Performance Computing Center



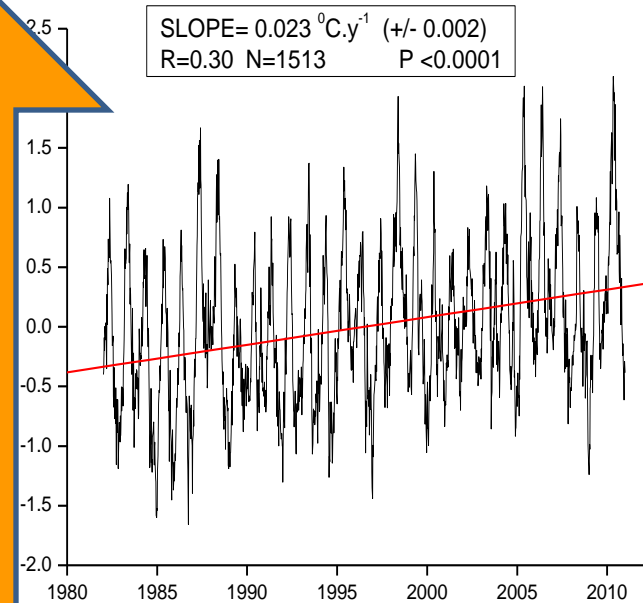
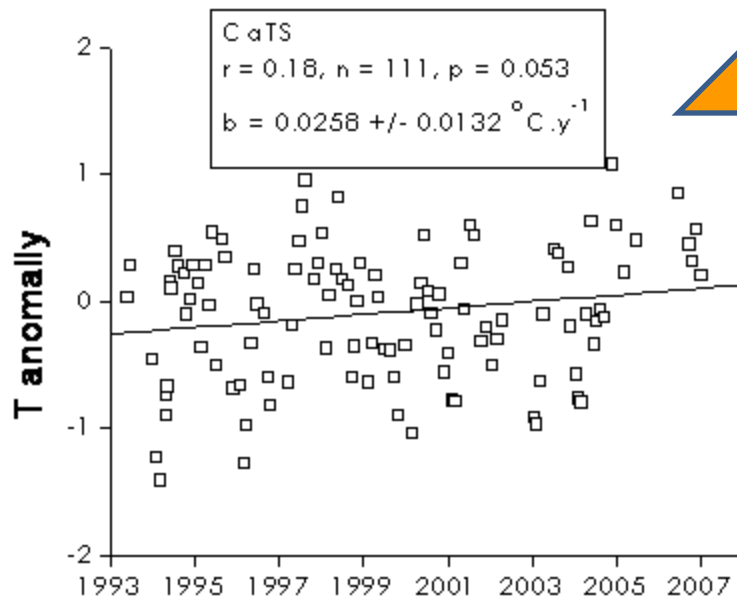
Puerto Rico is projected to warm faster than the global average with increases in both mean annual temperatures, and more days per year with temperatures above 85°F. The frequency of extreme precipitation events is projected to decrease, but the frequency of extreme precipitation events (e.g. more than 3 inches of rain in a day) is expected to increase. The frequency of extreme precipitation events (e.g. more than 3 inches of rain in a day) is expected to increase. The frequency of extreme precipitation events (e.g. more than 3 inches of rain in a day) is expected to increase. The frequency of extreme precipitation events (e.g. more than 3 inches of rain in a day) is expected to increase.

Temperature

**Precipitation
< 1 in/day**

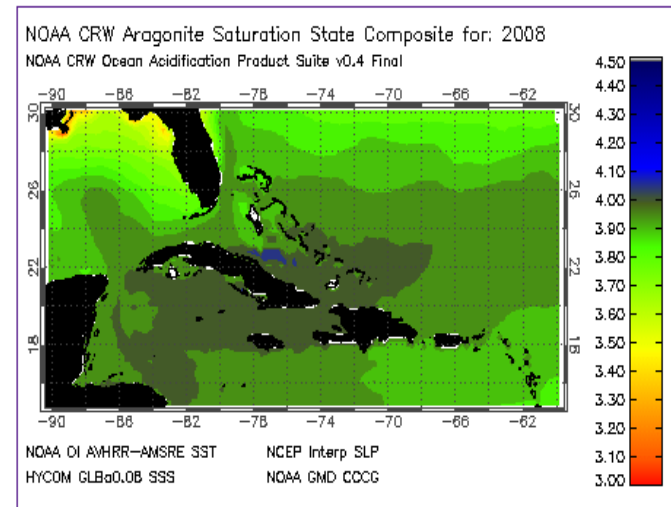
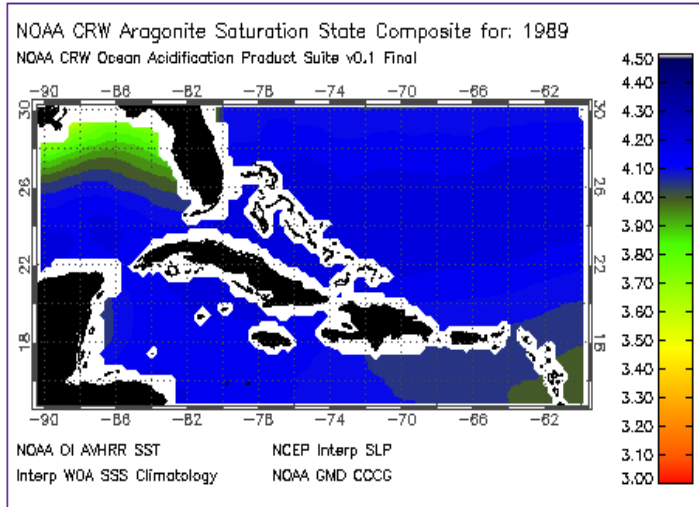
**Extreme precipitation
> 3in/day**

Sea Surface Temperatures (SST) – (CariCOOS)



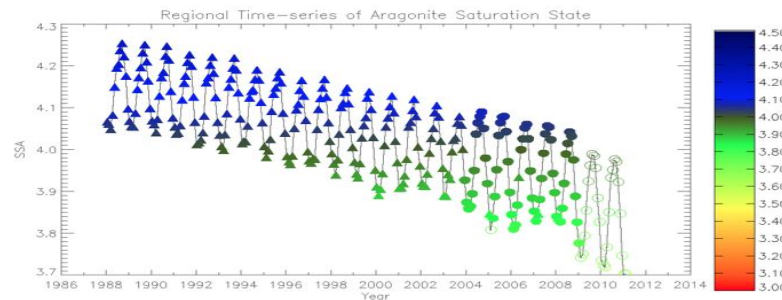
SST data from CaTS. The slope of the trend between 1993 and 2007 was linearly estimated as 0.0258 ± 0.0132 degrees Celsius/yr

Ocean Acidification: Puerto Rico Trends (CariCOOS)



NOAA_CRW_OAPS_SSA_Regional_Timeseries_1200x645.gif 1200x645 pixels

5/13/11 11:17 AM



http://coralreefwatch.noaa.gov/satellite/oa/saturationState_GCR.html

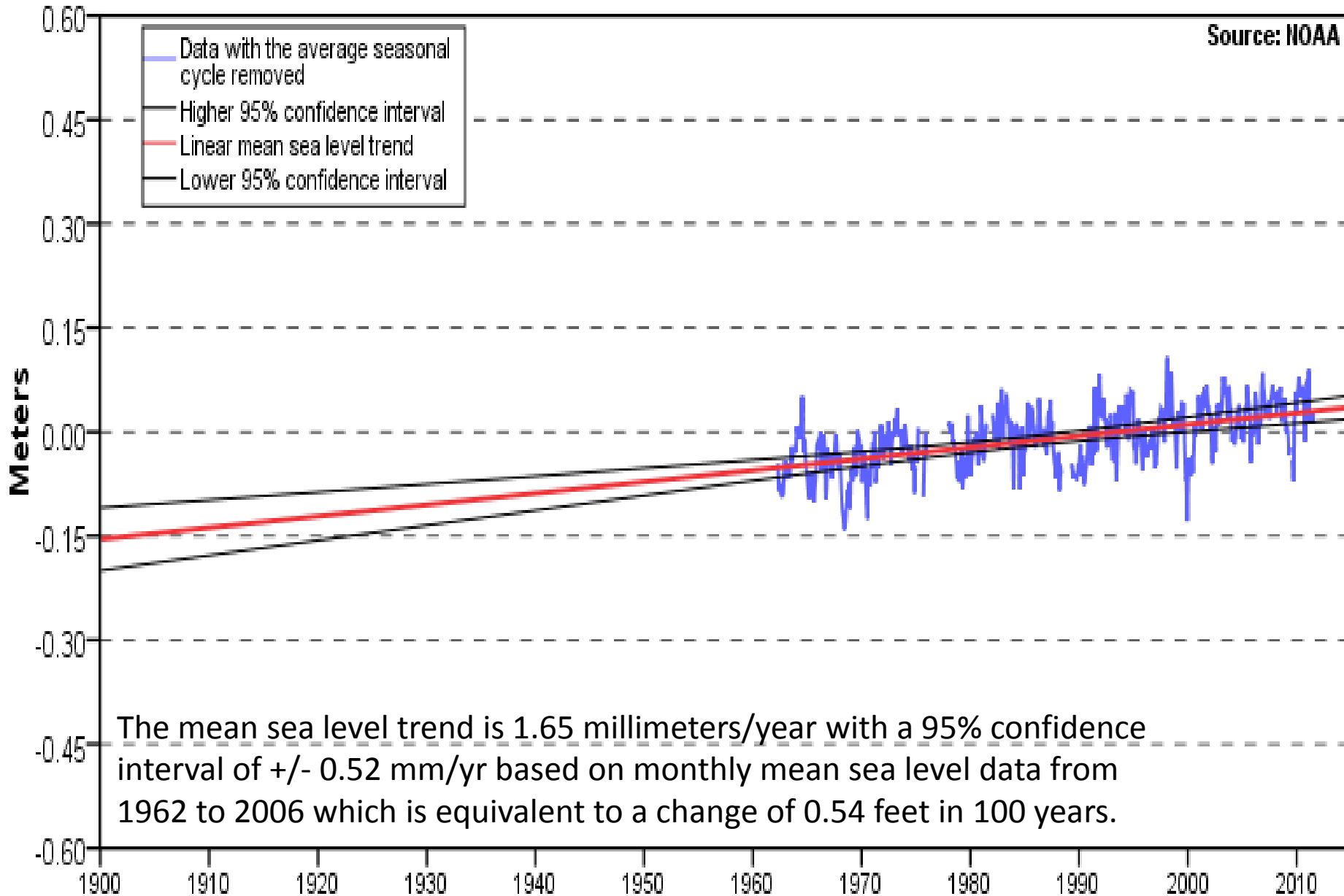


**Huracanes más intensos?
Más frecuentes?**

San Juan, PR

1.65 +/- 0.52 mm/yr

Source: NOAA

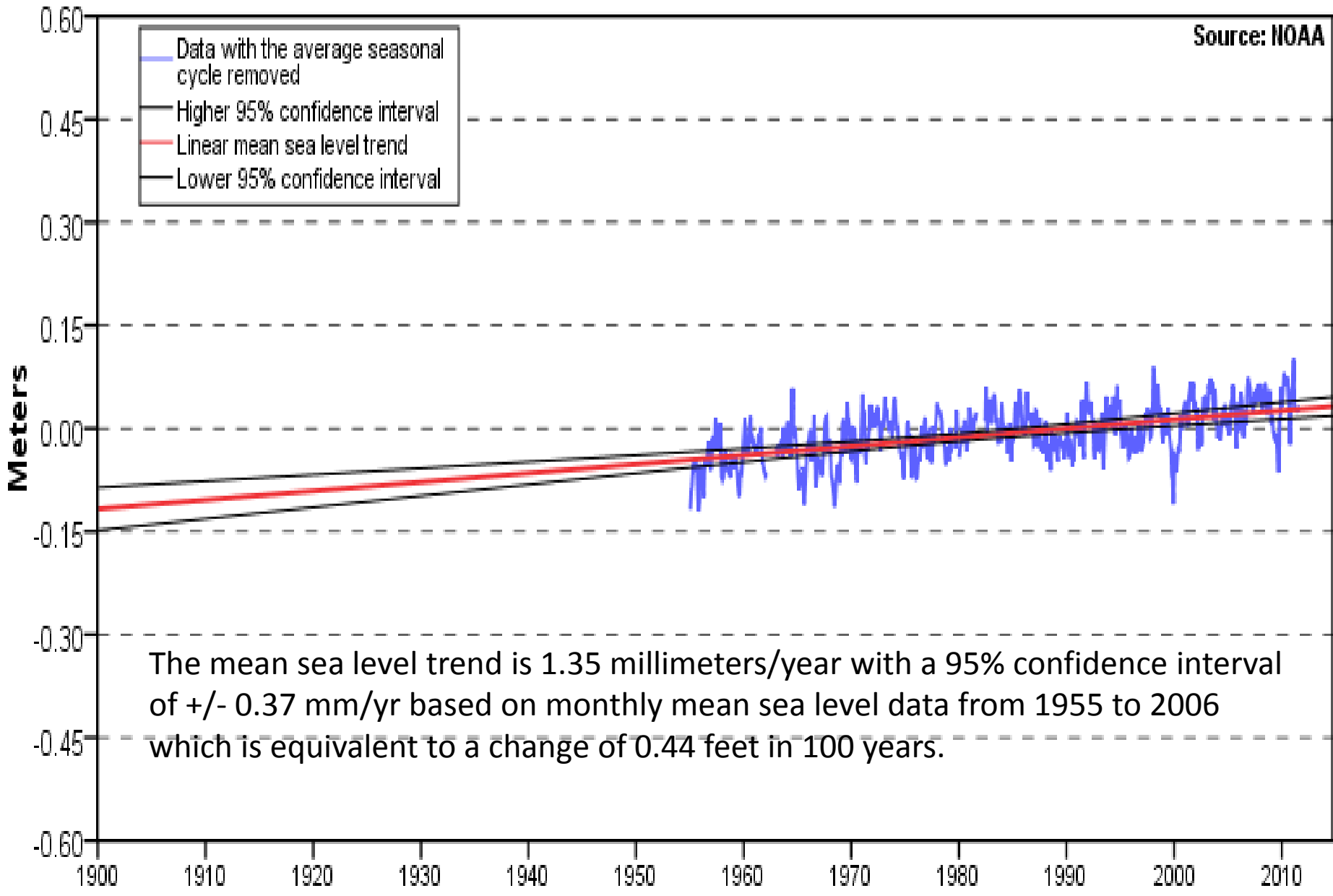


Magueyes Island, PR

1.35 +/- 0.37 mm/yr

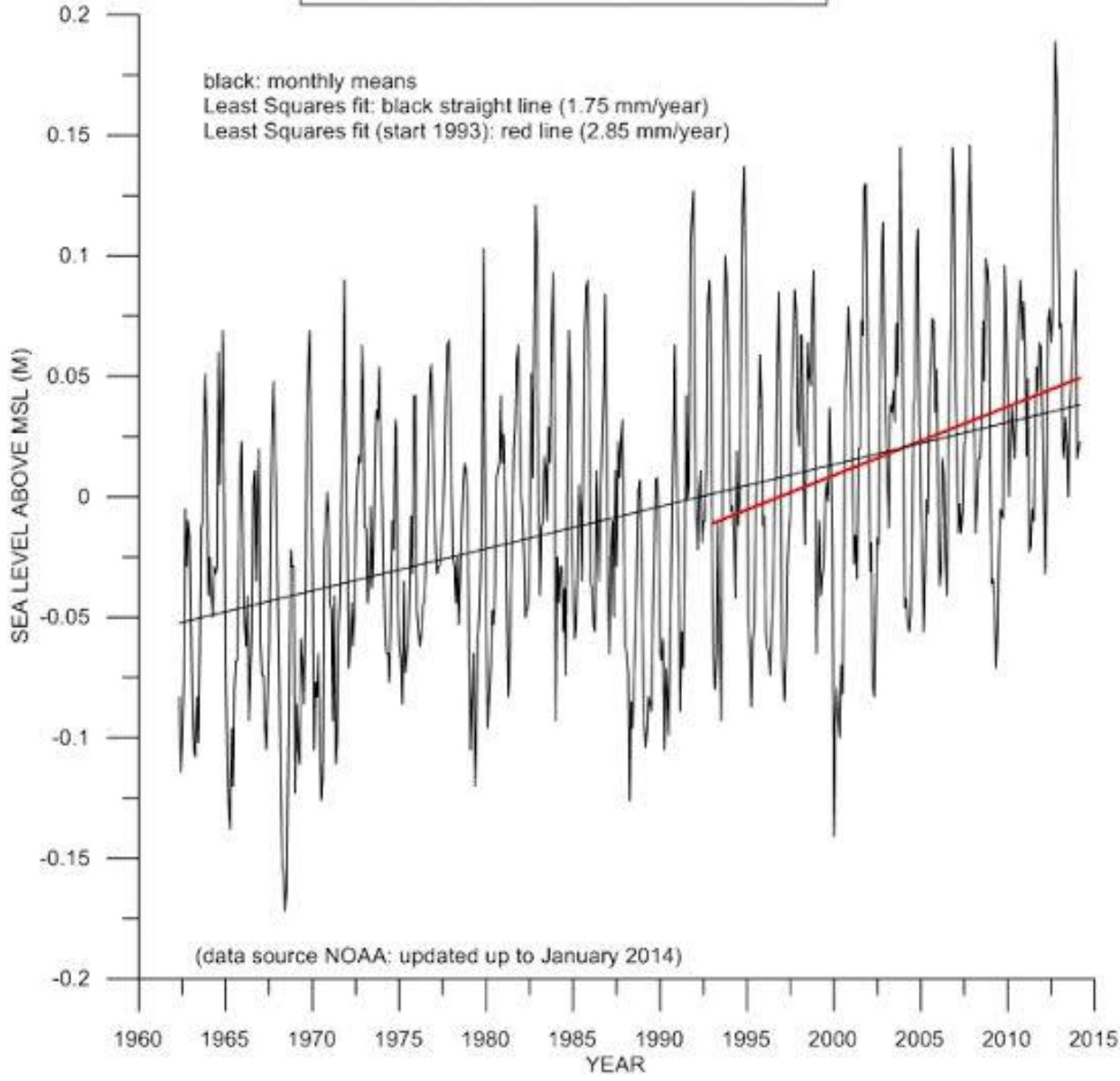
Source: NOAA

- Data with the average seasonal cycle removed
- Higher 95% confidence interval
- Linear mean sea level trend
- Lower 95% confidence interval



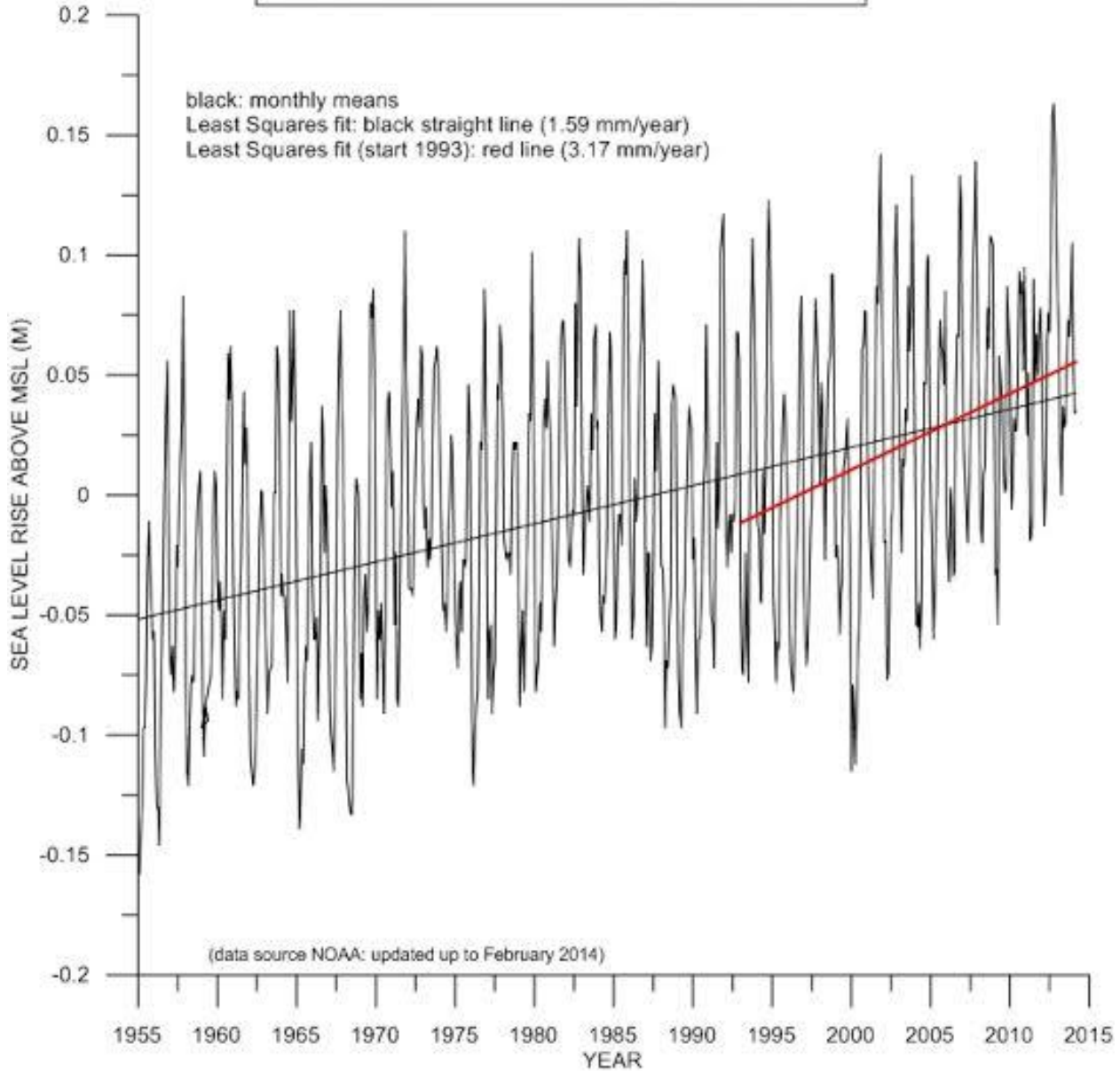
The mean sea level trend is 1.35 millimeters/year with a 95% confidence interval of +/- 0.37 mm/yr based on monthly mean sea level data from 1955 to 2006 which is equivalent to a change of 0.44 feet in 100 years.

SAN JUAN BAY SEA LEVEL RISE (from April 1962)

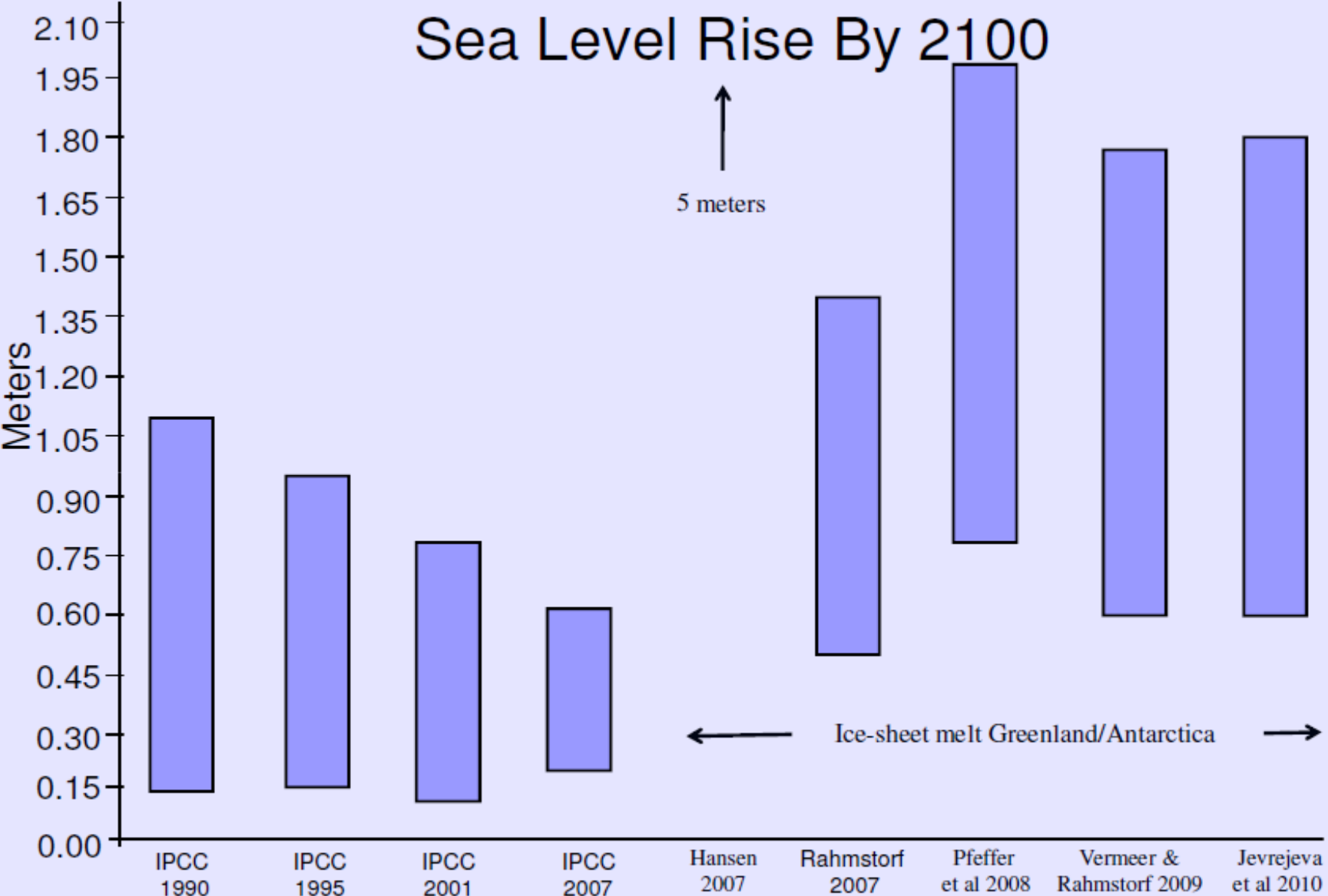


(data source NOAA; updated up to January 2014)

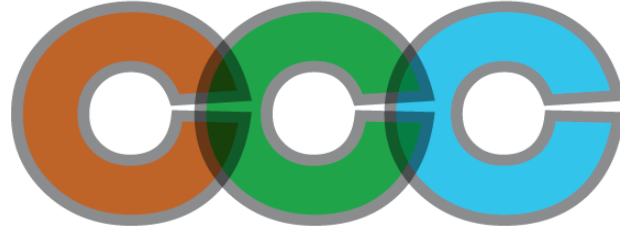
MAGUEYES ISLAND SEA LEVEL RISE (from January 1955)



Sea Level Rise By 2100



CONSEJO DE CAMBIOS CLIMÁTICOS



CLIMATE CHANGE COUNCIL
PUERTO RICO

Son los cambios observados en el clima y en los océanos inducidos por la actividad humana?

...tenemos que adaptarnos!

Infraestructura vulnerable

- Edificios públicos y privados
- Plantas de generación energía
- Sistemas sanitarios
- Cementerios
- Áreas turísticas y recreativas
- Centros comunales/
Bibliotecas
- Edificios y facilidades gubernamentales
- Escuelas, hospitales
- Monumentos históricos y culturales

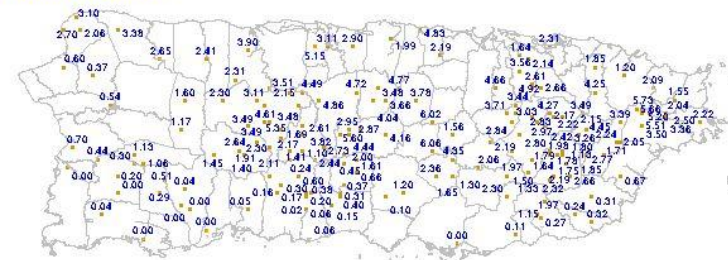


24 Hour Rainfall Amounts
November 9, 2001

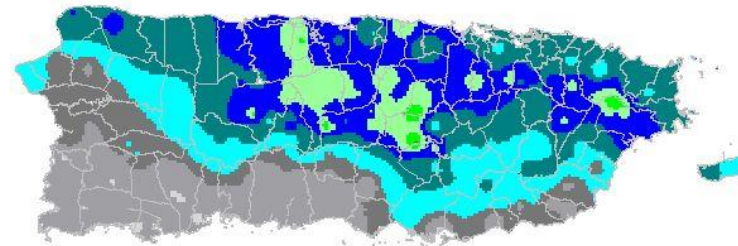
7AM - 7AM EDT



GAGE READINGS:



GAGE ANALYSIS:



AMOUNTS



Source: Hazard Mitigation Plans (courtesy of AEMEAD)

Infraestructura localizada a 1 km de la costa



- Ocho puertos
- Ocho aeropuertos
- Siete complejos de generación eléctrica
5 AEE (públicas), AES, Ecoeléctrica (privadas)
- 1,080 millas de infraestructura sanitaria
- 14 plantas de tratamiento de aguas usadas
- 81 parques industriales
- 114 millas de carreteras primarias















San Juan metro + 1m SLR

Puerto Rico

Localización de Hospederías y Riesgo de Inundación

Oceano Atlántico



Mar Caribe

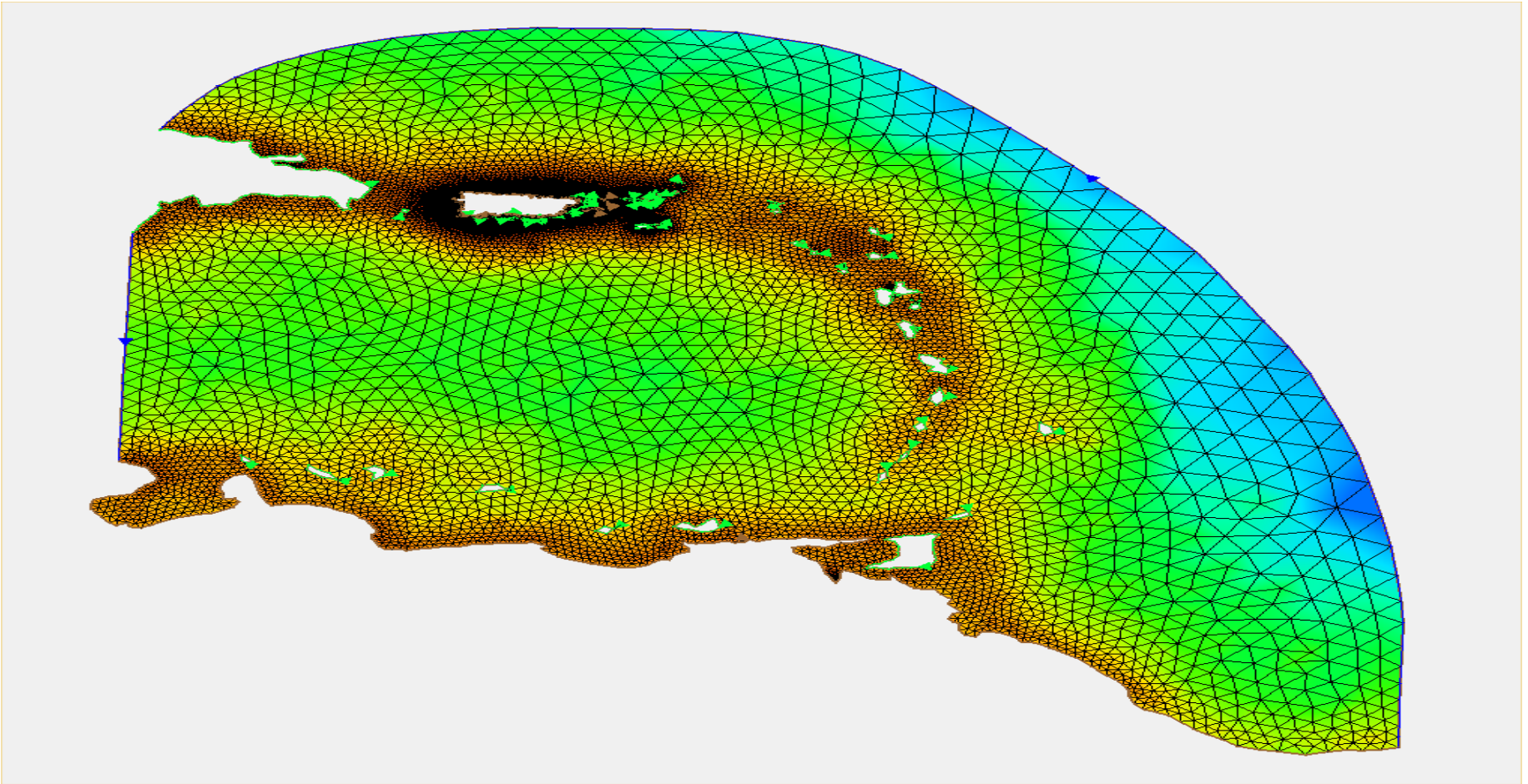
Leyenda

-  Hospederías Endosadas
-  Alto Riesgo de Inundación
-  Bajo a Moderado Riesgo de Inundación



PRCCC Working Groups





**Storm Surge Modeling in Puerto Rico in Support of Emergency Response,
Risk Assessment, Coastal Planning and Climate Change Analysis**

PRCZMP – UPR-M (P.I. AURELIO MERCADO)

Department of Marine Sciences, University of Puerto Rico, Mayaguez, P.R.

ipcc

INTERGOVERNMENTAL PANEL ON climate change

CLIMATE CHANGE 2013

The Physical Science Basis

WG I

WORKING GROUP I CONTRIBUTION TO THE
FIFTH ASSESSMENT REPORT OF THE
INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE





THE PRESIDENT'S CLIMATE ACTION PLAN

Executive Office of the President

June 2013



DEPARTMENT OF THE ARMY
U.S. Army Corps of Engineers
Washington, DC 20314-1000

EC 1165-2-212

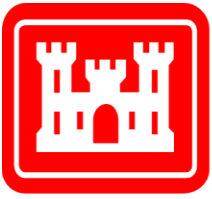
CECW-CE

Circular
No. 1165-2-212

1 October 2011

EXPIRES 30 September 2013
SEA-LEVEL CHANGE CONSIDERATIONS FOR
CIVIL WORKS PROGRAMS

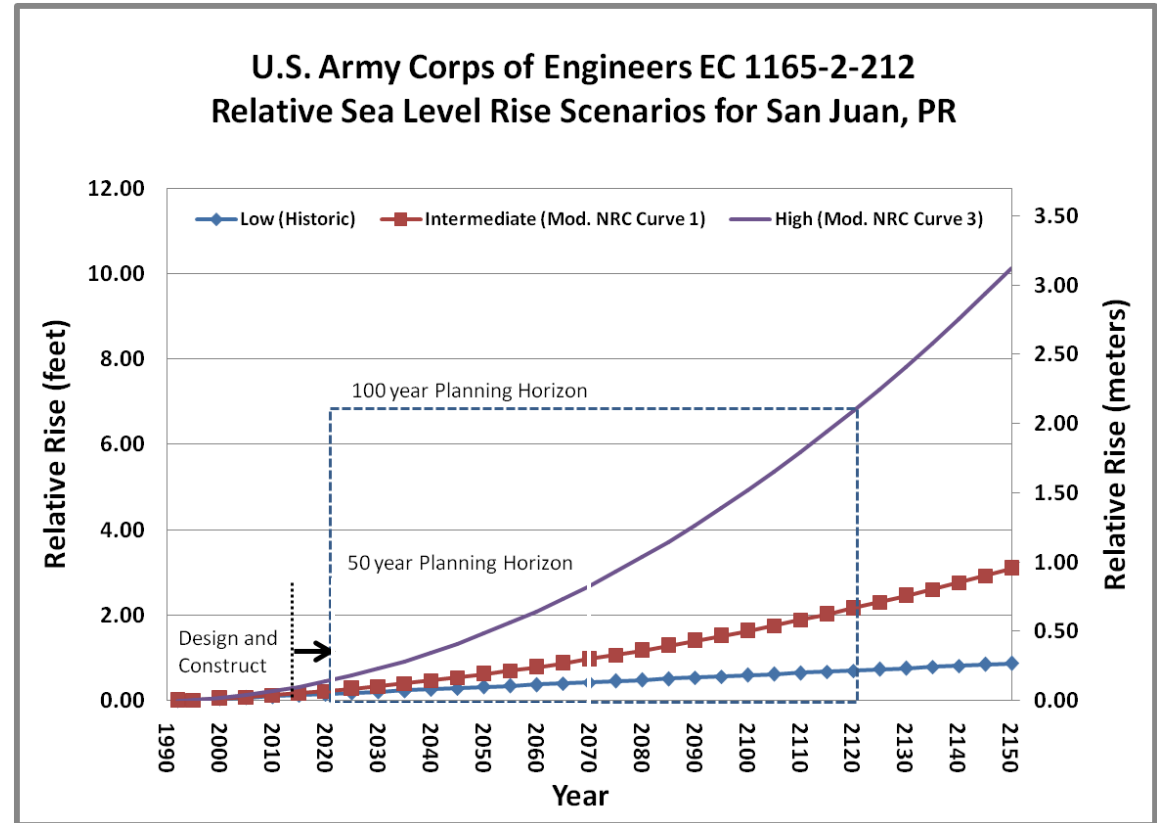
1. Purpose. This circular provides United States Army Corps of Engineers (USACE) guidance for incorporating the direct and indirect physical effects of projected future sea-level change across the project life cycle in managing, planning, engineering, designing, constructing, operating, and maintaining USACE projects and systems of projects. Recent climate research by the Intergovernmental Panel on Climate Change (IPCC) predicts continued or accelerated global warming for the 21st Century and possibly beyond, which will cause a continued or accelerated rise in global mean sea-level. Impacts to coastal and estuarine zones caused by sea-level change must be considered in all phases of Civil Works programs.



SLR Planning and Design considerations for Puerto Rico

US Army Corps
of Engineers®

- **by 2060:** 0.07 to 0.57 m above current msl
- **by 2110:** 0.14 and 1.70 m above current msl



1. PRCC Analysis Conducted by USACE , Jacksonville District
2. Section 22 Agreement has been formalized by DNER-USACE



PUERTO RICO INSURANCE/RE-INSURANCE STUDY

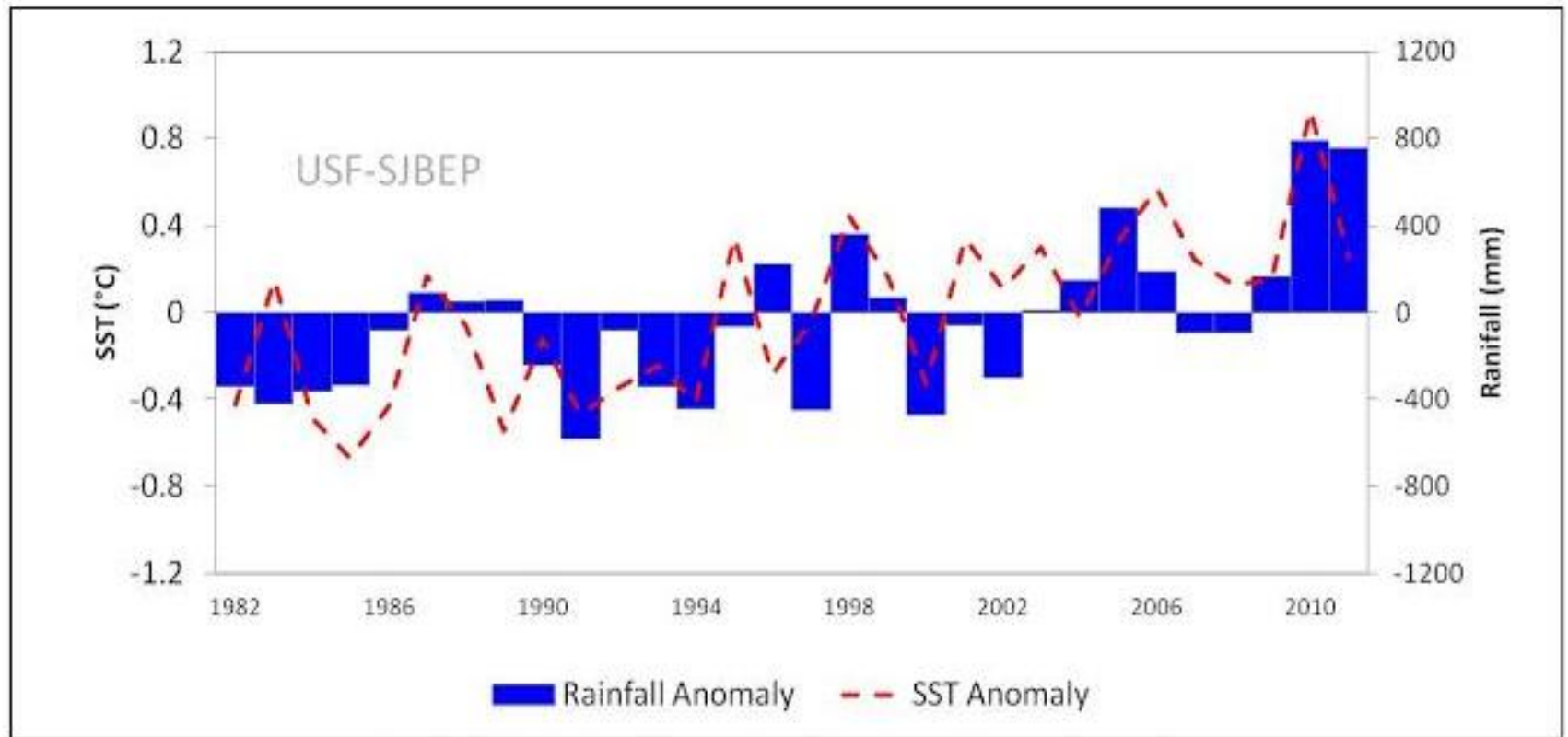
2013

*HOW THE INSURANCE INDUSTRY IN PUERTO RICO IS POSITIONED IN THE EVENTUALITY OF
A CHRONIC NATURAL DISASTER EVENT*

*Dr. Jaime Torres George-CTP
Moreno Santiago & Company
Economic Analysis Division*



Ecological Assessment of Generalized Littoral Environments Decision-Support System (EAGLE/OS). [Extreme Event Impacts on Air Quality and Water Quality with a Changing Global Climate \(2011\)](#). University of South Florida-College of Marine Sciences and San Juan Bay Estuary Program.



Dr. Pablo Méndez-Lázaro^{1,3} and Dr. Frank Muller Karger²

¹University of Puerto Rico Medical Sciences Campus-Department of Environmental Health

²University of South Florida College of Marine Sciences

³Post Doctoral Research Assistant: University of South Florida-College of Marine Sciences and San Juan Bay Estuary Program



From: **Margaret Allen - NOAA Affiliate** <margaret.allen@noaa.gov>

To: Ernesto Diaz <ediaz@drna.gobierno.pr>, Kasey Jacobs <kaseyrjacobs@caribbeanlcc.org>

Date: Mon, Dec 9, 2013 at 11:13 AM

Subject: 2014 Coastal Management Fellowship Matching Workshop

Hello 2014 fellowship mentors,

Congratulations again to all of you on being selected to host a 2014-2016 fellow. I'm looking forward to working again with those of you I know, and to meeting those of you that are mentoring for the first time. As a reminder, here is a timeline of where things currently stand:

January 24: applications are due to Sea Grant programs

February 24: Sea Grant will send their nominations to Coastal Services Center

March 21: 12 finalists are selected for the Matching Workshop. At that time, we will send you those 12 applications so that you can review them prior to the workshop.

Monday, April 28 to Friday, May 2: Matching Workshop

NOAA COASTAL SERVICES CENTER COASTAL MANAGEMENT FELLOWSHIP 2013

Puerto Rico Coastal Zone Management Program

Development of an Online Self-Assessment & Solutions Tool for Individuals, Communities, and Municipalities of Puerto Rico for Resilient Coastal Communities and Healthy Ecosystems

Proposal submitted to NOAA Coastal Services Center-Coastal Learning Services

Fellowship Mentors: Director Ernesto L. Diaz and Kasey R. Jacobs



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- [About Us](#)
- [The State of Climate](#)
- [PRCCC Working Groups](#)
- [Publications](#)
- [Meetings & Events](#)
- [Contact Us](#)



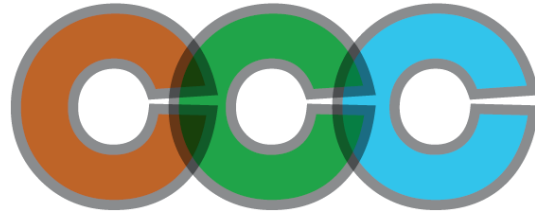
PUERTO RICO : POLÍTICAS PÚBLICAS

OE-2013-015	28-febrero-2013	Orden Ejecutiva del Gobernador del Estado Libre Asociado de Puerto Rico, Hon. Alejandro J. García Padilla, ordenando a la Junta de Planificación a finalizar y adoptar el Plan de Uso de Terrenos de Puerto Rico.
OE-2013-016	28-febrero-2013	Orden Ejecutiva del Gobernador del Estado Libre Asociado de Puerto Rico, Hon. Alejandro J. García Padilla, ordenando el desarrollo de un estudio sobre la vulnerabilidad de la infraestructura pública ante los cambios climáticos y la adopción de planes de adaptación para confrontar los hallazgos del estudio.
OE-2013-017	28-febrero-2013	Orden Ejecutiva del Gobernador del Estado Libre Asociado de Puerto Rico, Hon. Alejandro J. García Padilla, ordenando la creación del Consejo de Acción para la Sostenibilidad de Puerto Rico.
OE-2013-018	28-febrero-2013	Orden Ejecutiva del Gobernador del Estado Libre Asociado de Puerto Rico, Hon. Alejandro J. García Padilla, ordenando la cuantificación de las emisiones de los gases con efecto de invernadero en Puerto Rico y la elaboración de un plan para la reducción de estas emisiones con el fin de acercarnos a la meta de carbono neutral.
OE-2013-019	28-febrero-2013	Orden Ejecutiva del Gobernador del Estado Libre Asociado de Puerto Rico, Hon. Alejandro J. García Padilla, para ordenar al Departamento de Recursos Naturales y Ambientales a realizar el Deslinde Nacional de la Zona Marítimo Terrestre.

RECOMENDACIONES

- Desarrollar modelos geofísicos para la determinación de riesgos de inundación con validaciones a nivel local.
- Desarrollar modelos económicos para evaluar riesgos, potencial de pérdidas, costos de protección, adaptación o reemplazo que permitan establecer prioridades de inversión.
- Promover la participación de los gremios y asociaciones de profesionales, industriales, cámaras de comercio, facultades de ciencias, planificación, arquitectura, ingeniería, diseño, ciencias médicas, agronomía y economía, entre otras.
- Integrar a las comunidades locales en los procesos de planificación para construir un futuro sostenible, seguro, productivo y resiliente.

CONSEJO DE CAMBIOS CLIMÁTICOS



CLIMATE CHANGE COUNCIL
PUERTO RICO



V REUNIÓN CUMBRE

ISLA VERDE, PUERTO RICO

28 MARZO 2014