CPACC, World Bank, OAS, CIDS, GCSI Technical Meeting

Caribbean Observations in a Global Context
Module II: The Oceans

Temperature and Sea Level in Global Ocean Observing System

George A. Maul
Florida Institute of Technology
Department of Marine and Environmental Systems
Melbourne, Florida 32901 USA

Florida Institute of Technology · College of Engineering
Department of Marine & Environmental Systems
Science · Engineering · Management

Oceanography
Ocean Engineering
Environmental Science
Meteorology

Temperature and Sea Level
in Global Ocean Observing System

Outline of the Talk

Introduction

Integrated temperature measuring system:

- satellites, ships, buoys, and coastal stations

Ancillary benefits:

- climate change, MCSST verification, coastal upwelling

Integrated sea level measuring system:

- satellites, IES/PGs, tide gauges, GPS

Ancillary benefits:

- tides, seiche, storm surge, sea-level change, currents, and tsunami

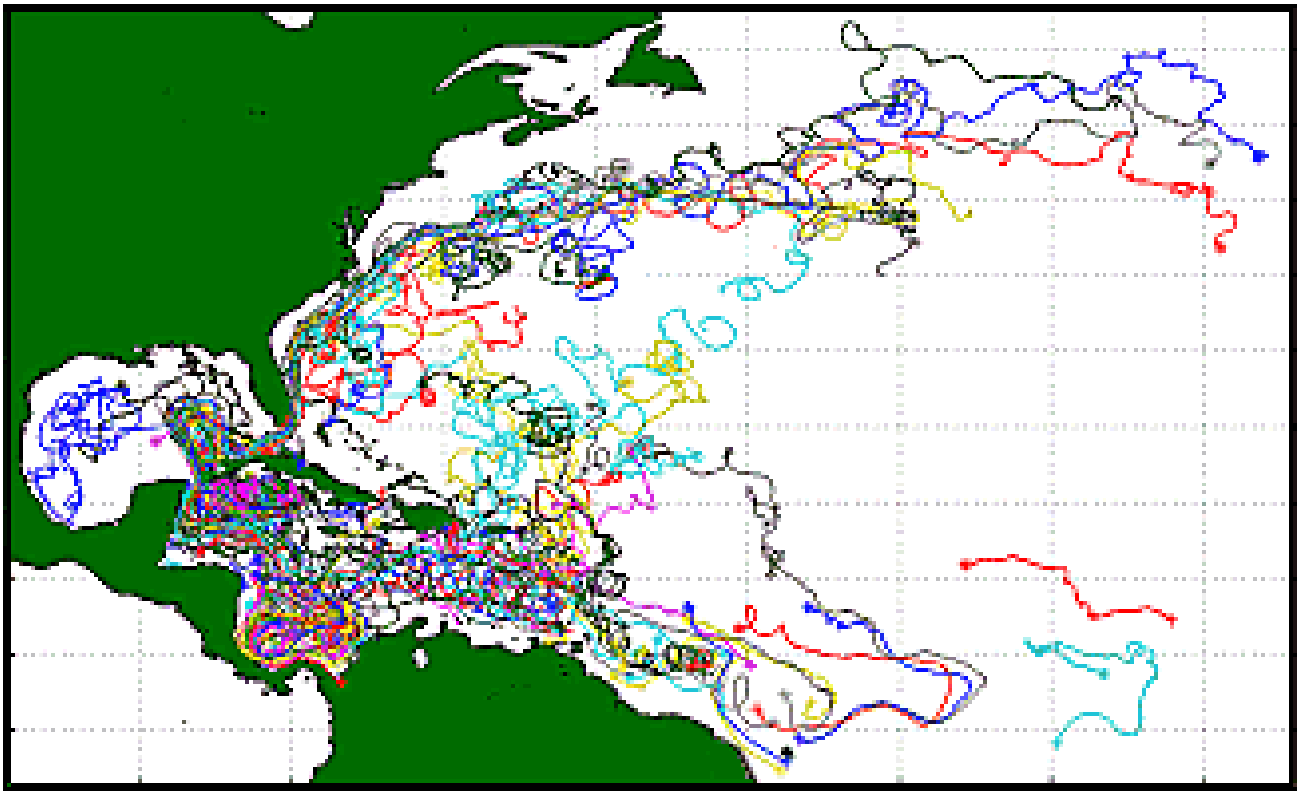
Data archeology: what can our children expect to learn from CPACC?

Summary and Conclusions

CPACC, World Bank, OAS, CIDS, GCSI Technical Meeting

Caribbean Observations in a Global Context
Module II: The Oceans

Temperature and Sea Level in Global Ocean Observing System

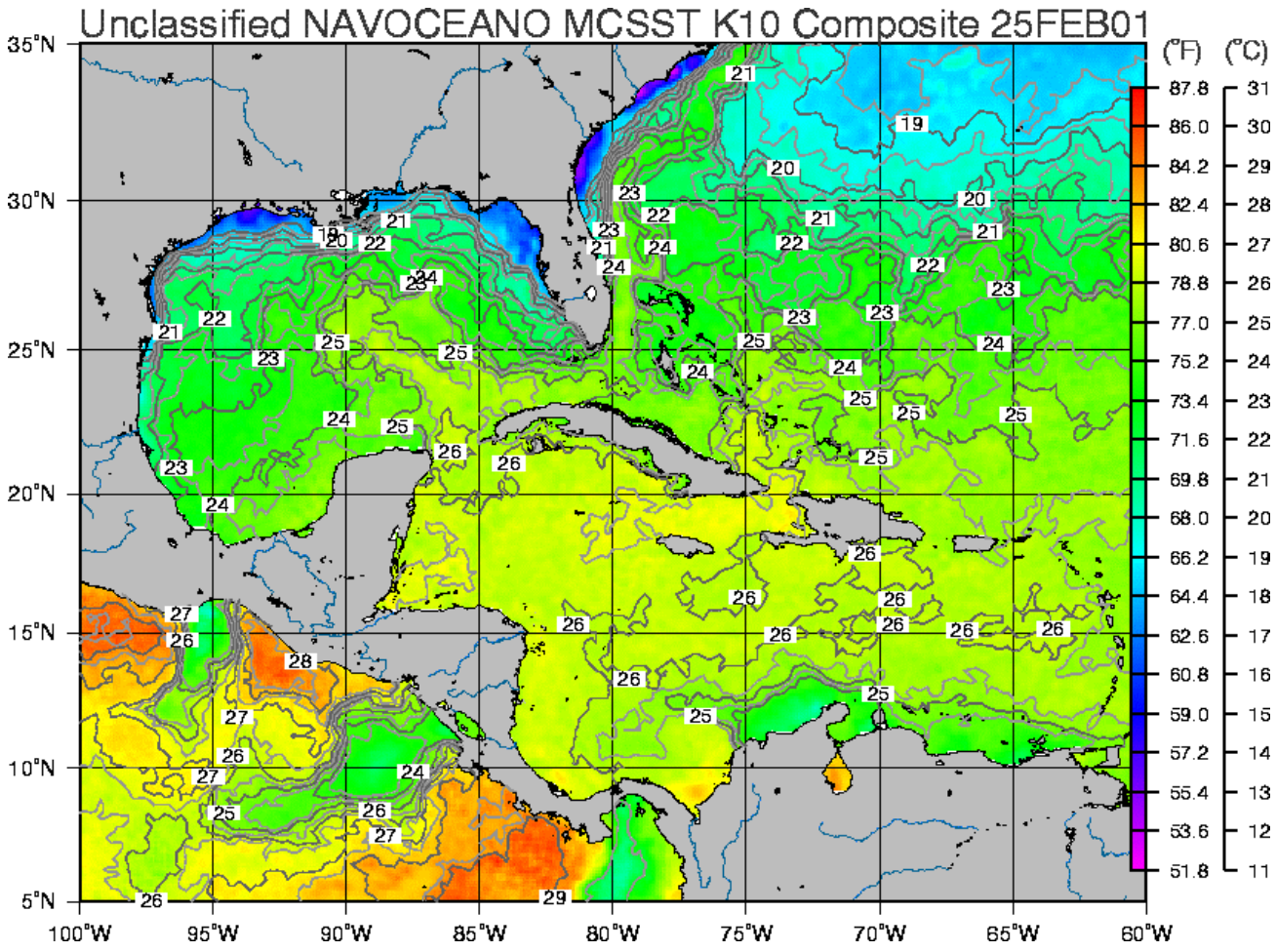


Satellite tracked free-drifting buoys in the Intra-Americas Sea

CPACC, World Bank, OAS, CIDS, GCSI Technical Meeting

Caribbean Observations in a Global Context
Module II: The Oceans

Temperature and Sea Level in Global Ocean Observing System

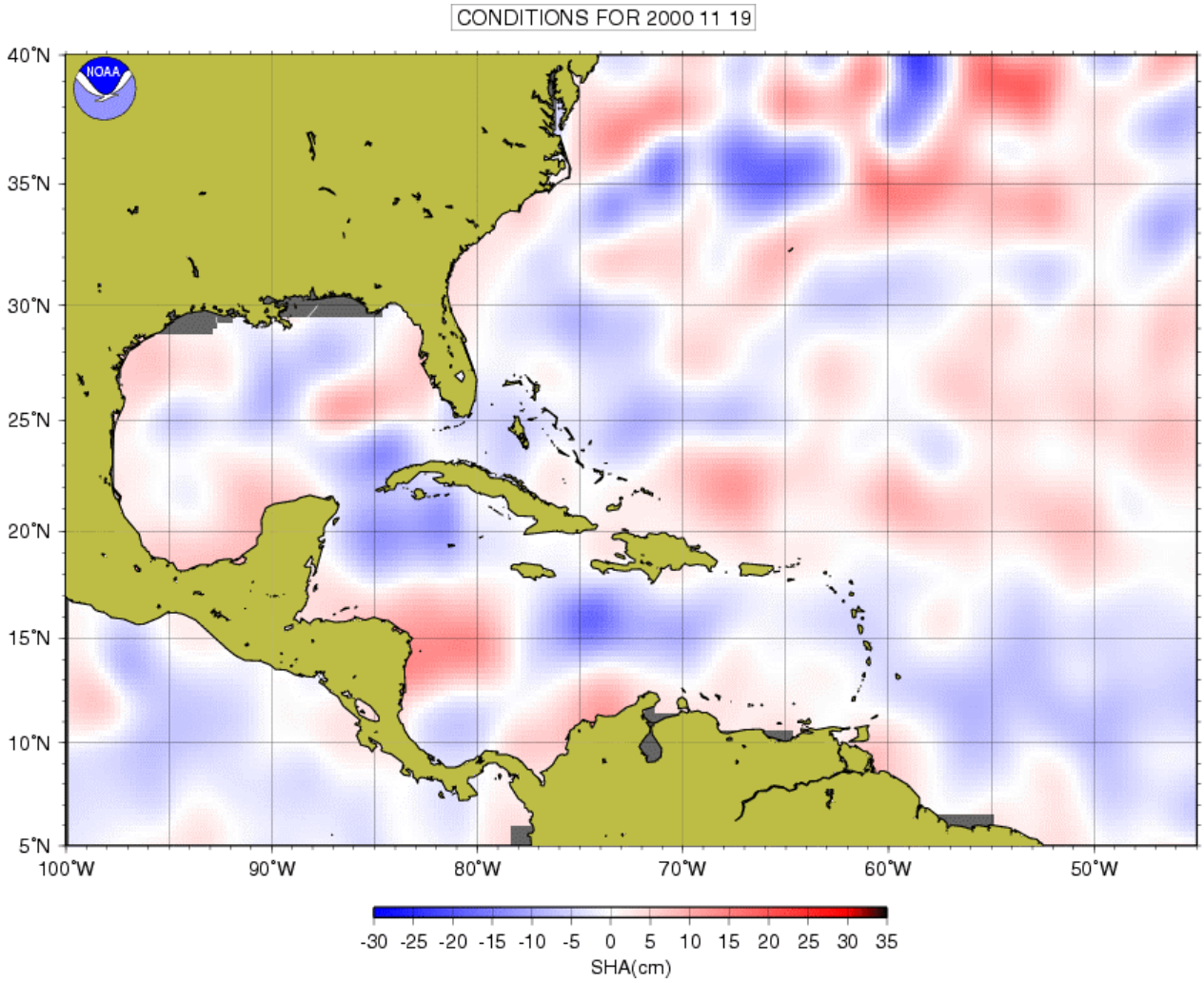


Satellite sea surface temperature in the Intra-Americas Sea

CPACC, World Bank, OAS, CIDS, GCSI Technical Meeting

Caribbean Observations in a Global Context
Module II: The Oceans

Temperature and Sea Level in Global Ocean Observing System



Satellite sea surface height in the Intra-Americas Sea

Sea Water Temperatures from USA Tide Gauges

Station	Years	N	Trend*	SE*	r^2
Boston	1921-1994	69	3.6	±0.3	0.65
New York	1926-1994	61	1.8	±0.4	0.25
Atlantic City	1911-1991	54	0.9	±0.4	0.01
Baltimore	1914-1993	65	0.9	±0.5	0.05
Charleston	1921-1992	70	-0.1	±0.3	0.01
Mayport	1944-1993	46	0.2	±0.6	0.00
Key West	1926-1994	36	0.0	±0.3	0.00
Galveston	1921-1992	36	-0.1	±0.5	0.01
Los Angeles	1923-1991	40	0.8	±0.4	0.08
San Francisco	1921-1994	78	0.5	±0.4	0.03
Seattle	1922-1994	41	0.0	±0.4	0.00
Neah Bay	1935-1994	53	1.1	±0.4	0.13
Seward	1925-1993	29	0.1	±0.4	0.00

* $°C \cdot 100yr^{-1}$

Temperature and Sea Level
in Global Ocean Observing System

Summary and Conclusions

- Integrated systems deliver more than the sum of their individual parts

- Satellite, buoy, and ship observations require regular calibrated verification data

- Coastal marine observatories are a cost-effective means of monitoring climate change and providing stable datasets

- Data archeology is a necessary and exciting means to discovery