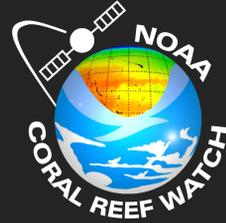


# Incorporating High-resolution Coastal VIIRS SSTs for NOAA Coral Reef Watch's Management Decision Support System

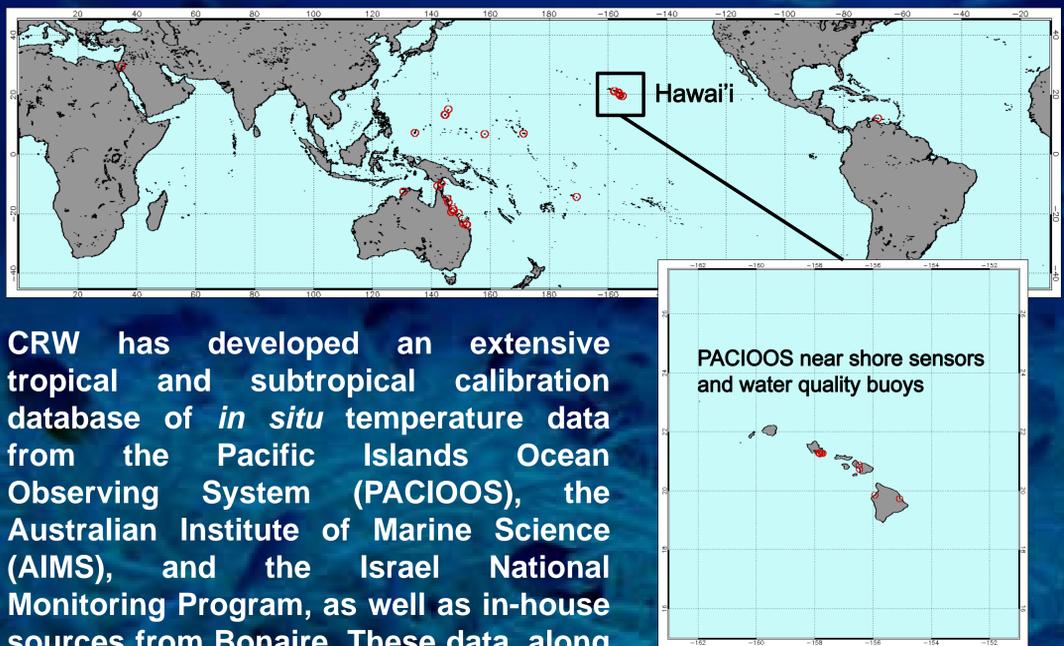


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NOAA's Coral Reef Watch (CRW) uses satellite data to provide a decision support system for coral reef management, including the only early-warning system for coral bleaching with global coverage. This system helps managers and other stakeholders worldwide prepare for and respond effectively to coral reef ecosystem environmental stressors. The single largest request of our primary users has been for higher resolution satellite sea surface temperatures (SST)-based monitoring products. The Visible Infrared Imager Radiometer Suite (VIIRS) aboard the National Polar-orbiting Operational Environmental Satellite System Preparatory Project (NPP) satellite and planned Joint Polar Satellite System (JPSS) satellites will allow CRW to develop and deliver decision support tools at much finer resolution than those we currently provide at 5 km and 50 km resolution to help coral reef managers pinpoint areas vulnerable to bleaching and prioritize resources for resilience enhancement and bleaching response efforts.

## Expanding Coral Reef Watch Early Warning System for Mass Coral Bleaching Events (Validating VIIRS SSTs and testing VIIRS-only thermal stress products)

### Calibration Database

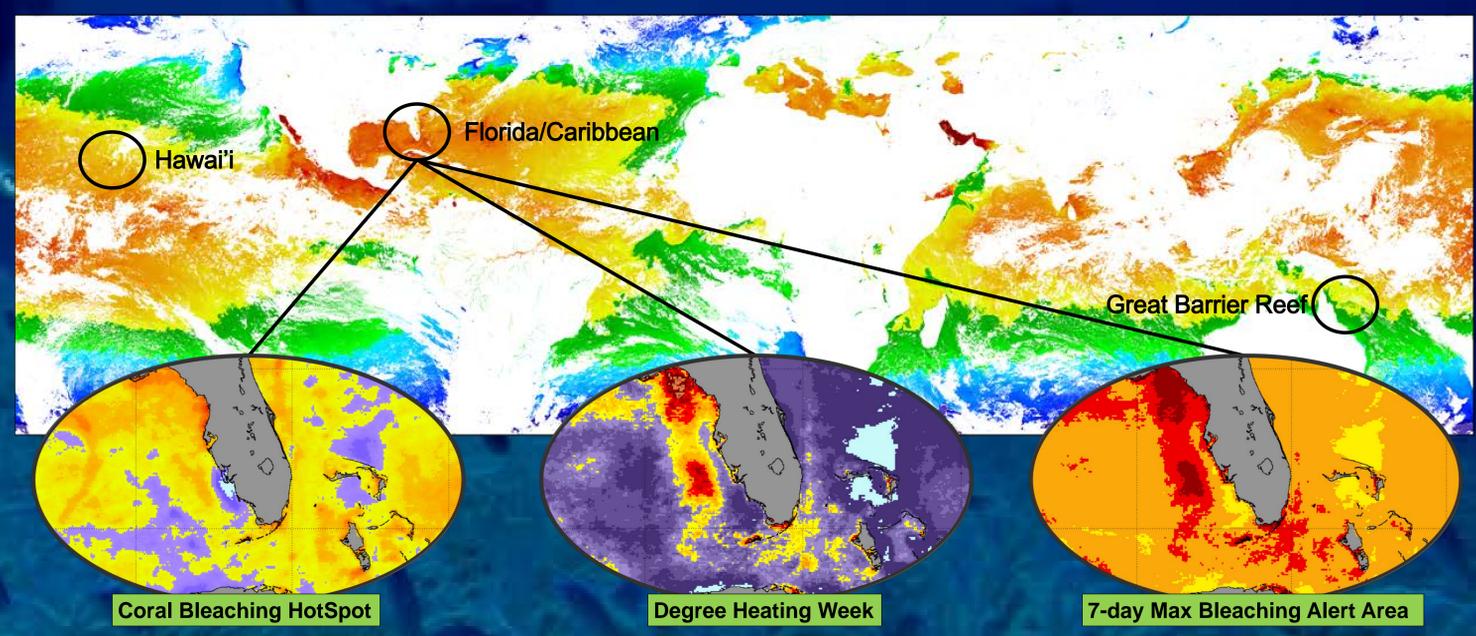


CRW has developed an extensive tropical and subtropical calibration database of *in situ* temperature data from the Pacific Islands Ocean Observing System (PACIOOS), the Australian Institute of Marine Science (AIMS), and the Israel National Monitoring Program, as well as in-house sources from Bonaire. These data, along with the existing data stream from STAR's *in situ* SST Quality Monitor (iQUAM v2) are being used to test the accuracy of reprocessed NPP-VIIRS SSTs at 0.02 degree resolution in three pilot regions: Hawaii, the Great Barrier Reef, and Florida and the surrounding Caribbean. Red circles in the map above indicate the locations of *in situ* data CRW has added into iQUAM v2. This effort required a reprogramming of iQUAM and the SST Quality Monitor (SQUAM) to include coastal *in situ* temperature data (<10km from the coast) in its analysis.

**Acknowledgements:**  
Additional collaborations with Frank Muller-Karger with the University of South Florida and Liane Guild with NASA AMES for development of 5-km products.

### Adapting CRW algorithms for non-gap-filled VIIRS data

VIIRS L3C 0.02 Deg SST for August 6, 2015



▲ CRW will test existing thermal stress algorithms on reprocessed 0.02-degree VIIRS L3 SST data for the three target regions shown above. The three ovals show example thermal stress products (for Florida) derived from NESDIS' existing 5 km Geo-Polar Blended SST Analysis; we will produce comparable near-real-time satellite products using the VIIRS SST. This effort requires development of a climatology from the VIIRS SST back to the beginning of the mission, and an algorithm to handle data gaps. These VIIRS-only products will be delivered through CRW's website, for product testing and user feedback. We have proven in the past that blended satellite data are essential for reliable gap-free analyses of ocean temperatures; therefore, CRW has proposed to the JPSS PGR program to continue this project and develop reef-targeted 1 or 2 km products, using a blend of 750 m VIIRS, 2 km Himawari-8, and GOES-R SSTs. This effort will specifically target coral reef applications but will also result in advances in analysis systems applicable to improving coastal SSTs globally.

Satellite SST	Resoln	Production period	Quality flags	Further info
MetOp-A AVHRR FRAC	~1km	18-Oct-2012 on	Cloudy pixels removed based on mask	URL: PFR EMail: Product Description
MetOp-A AVHRR FRAC	~1km	Dec-2008 on	QIF = 3 (suspects, also acceptable, Suspected)	URL: PFR EMail: Product Manual
MetOp-A AVHRR FRAC	~1km	Apr-2010 on	Cloudy pixels removed based on mask	URL: PFR EMail: Product Description
NOAA-18 Terra Aqua	~1km	22-Jan-2012 on	xx	URL: Product Description
NPP-SeaWiFS	~1km	23-Jan-2012 on	Classify pixels identified by ACSPO mask	URL: PFR EMail: Product Manual
NOAA-18 Terra Aqua	~1km	23-Apr-2012 on	Cloud mask: conformity check (SST-QP unused)	URL: PFR EMail: Product Manual
NOAA-18 Terra Aqua	~1km	23-Apr-2012 on	QIF = 3 (suspects, also acceptable, Suspected)	URL: PFR EMail: Product Manual



<http://coralreefwatch.noaa.gov>

The only satellite-based system available for U.S. and global coral reef management

**Coral Reef Watch:** a NOAA/NESDIS program, funded predominantly by the NOAA Coral Reef Conservation Program (CRCP), integrates scientists from the Center for Satellite Applications and Research (STAR) and the Office of Satellite and Product Operations (OSPO).