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Update on SDG 14.3.1 Indicator and the Methodology

Eighth Meeting of the Inter-Agency and Expert Group
on the Sustainable Development Goal Indicators
6 – 8 November 2018

NO SMOKING

SDG indicator 14.3.1 development



Goal 14. Conserve and sustainably use the oceans, seas and marine resources for sustainable development

Target 14.3 Minimize and address the impacts of ocean acidification, including through enhanced scientific cooperation at all levels

Indicator: 14.3.1

Average marine acidity (pH) measured at agreed suite of representative sampling stations

Tier III Indicator for which there are no established methodology and standards or methodology/standards are being developed/tested.

SDG indicator 14.3.1 development

Meeting of **Expert Group 16-18 January 2018** at IOC HQ
Review of existing preliminary methodology



In cooperation with **IODE** global assessment of MS capacity to store and
serve 14.3.1 data



Meeting of **GOA-ON Executive Council May 2018**
Final comments on 14.3.1 methodology



51st Session of IOC Executive Council July 2018



GOA-ON Global Ocean Acidification Observing Network Executive Council Meeting
28-30 May 2018, Sopot, Poland



INSTITUTE OF OCEANOLOGY
POLISH ACADEMY OF SCIENCES



14.3.1 provides guidance on:

- Definitions,

This indicator is based on observations that constrain the carbon system, which are required to capture the variability in ocean acidity at locations providing ocean services. The carbon system in this context refers mainly to the four measurable parameters: pH (the concentration of hydrogen ions on a logarithmic scale), CT (total dissolved inorganic carbon), pCO₂ (carbon dioxide partial pressure), and AT (total alkalinity). Ocean acidification is a reduction in the pH of the ocean over an extended period of typically decades or longer, which is caused primarily by uptake of carbon dioxide from the atmosphere. Ocean services are the benefits the ocean provides to people, which may be recreational, economic, environmental (by providing coastal protection) or cultural. Average as used herein is the equally weighted annual mean.

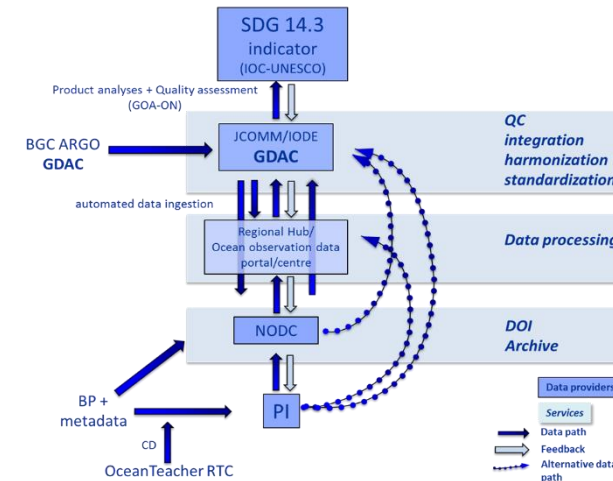
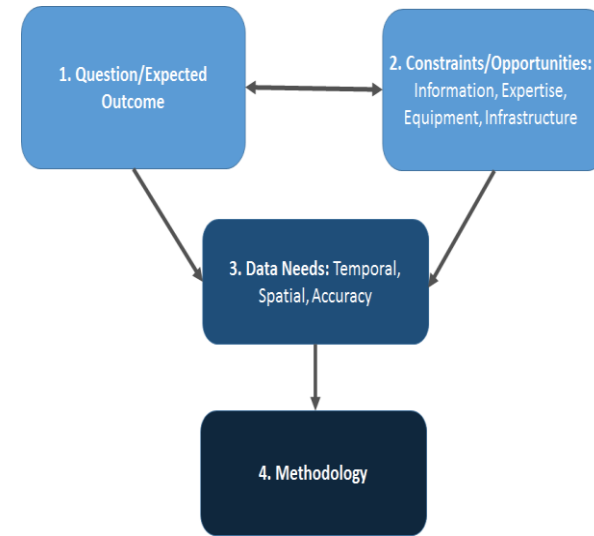
A agreed suite of representative sampling stations are sites that: 1) have a measurement frequency adequate to describe variability and trends in carbonate chemistry to deliver critical information on the exposure of and impacts on marine systems to ocean acidification, 2) provide data of sufficient quality and with comprehensive metadata information to enable integration with data from other sites in the country.

- Units

pH on total scale, and/or pCO₂ [μatm or ppt], CT [μmol kg⁻¹], AT [μmol kg⁻¹]

14.3.1 provides guidance on:

- Definitions
- Units
- Rationale for inclusion
- Computation method – aggregation and disaggregation
- Sampling strategy, including sampling frequency
- Methods and guidance available to countries for the compilation of data at the national level, including:
 - overview on best practices,
 - standard operating mechanisms,
 - measurement and data collection,
 - measurement and data quality
- Data sources, including:
 - the collection process,
 - data visualization and
 - quality control mechanisms



SDG indicator 14.3.1 development:

51st Session of IOC Executive Council July 2018

Decision: IOC/EC-LI/4.4 welcoming the methodology and to pursue with the Tier re-classification



July-August 2018: **Data collection approaching NODCs and ADUs**, which stated to have relevant data sets



17-19 October 2018: **IOC expert meeting**, to apply data quality control mechanisms, categorize the data quality of different data sets and visualize 14.3.1 data sets (Map 1 with points indicating data contributors – colour coded to show the 3 data quality categories; Map 2 with points indicating high quality data of annual equally weighted mean pH (surface) and variability).



IAEG-SDGs

Inter-agency Expert Group on SDG Indicators

NODCs/ADUs – 14.3.1 data

Survey in February/March 2018

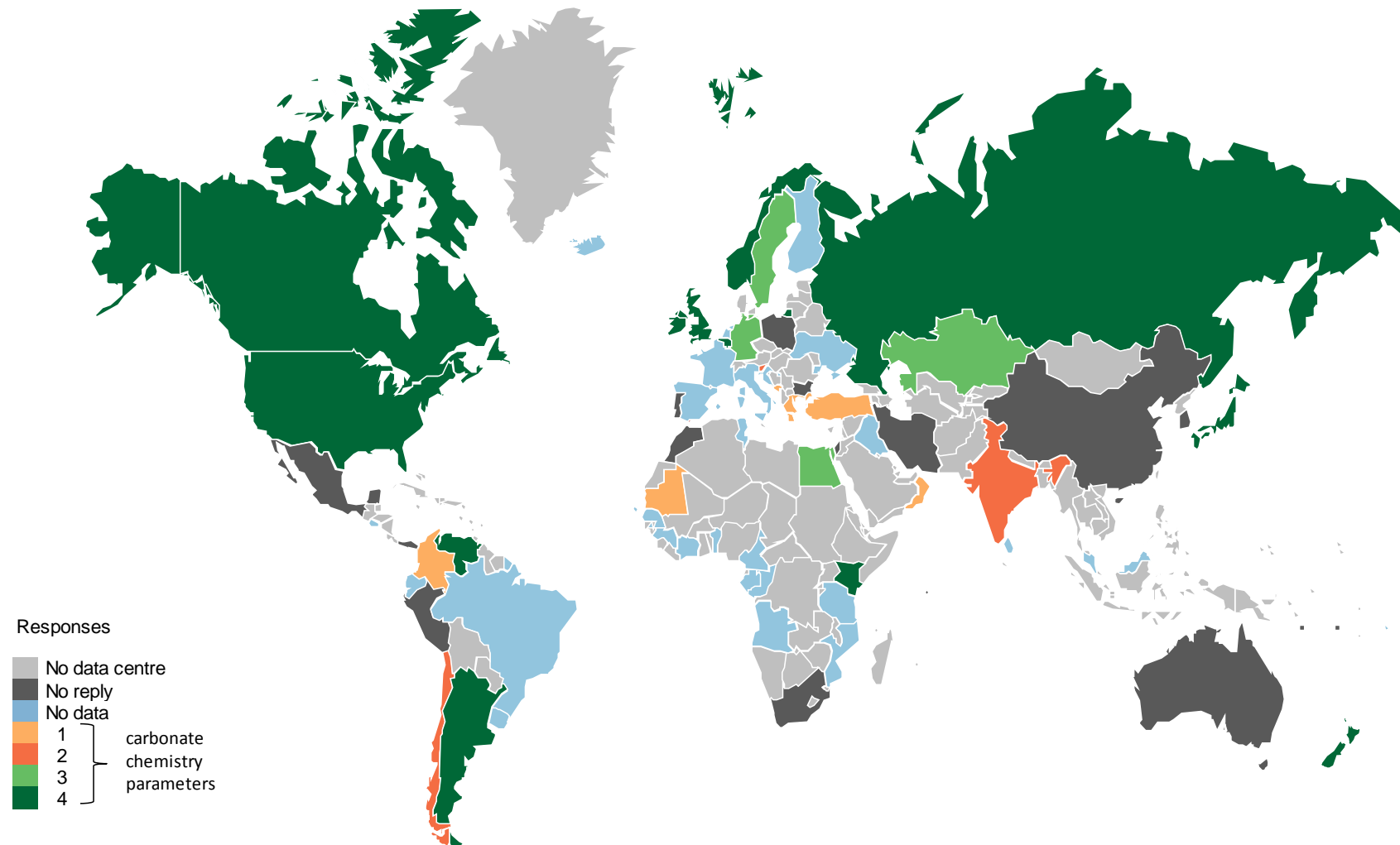
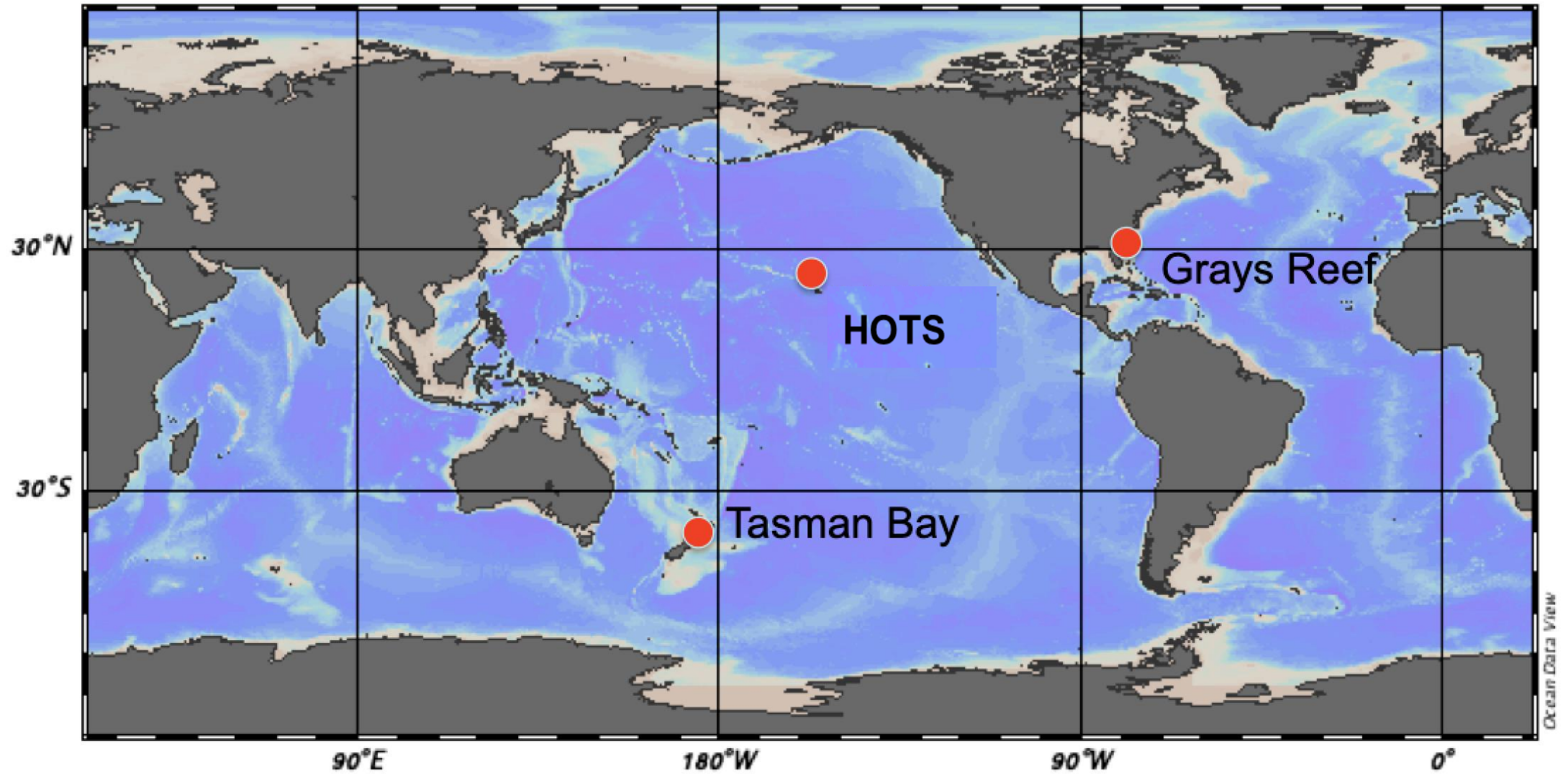


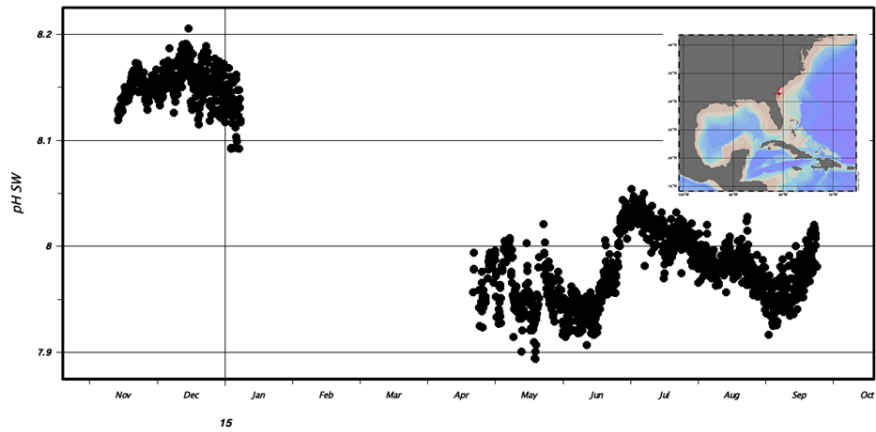
Figure 1. Map illustrating the answers received from NODCs and ADUs regarding the availability of data describing the carbonate system (pH, TA, DIC, CO₂; light grey – no IODE focal point for NODC or ADU, dark grey – no reply, blue – no data, yellow – data for one parameter, orange – data for two parameters, light green – data for three parameters, dark green – data for four parameters).

14.3.1 data

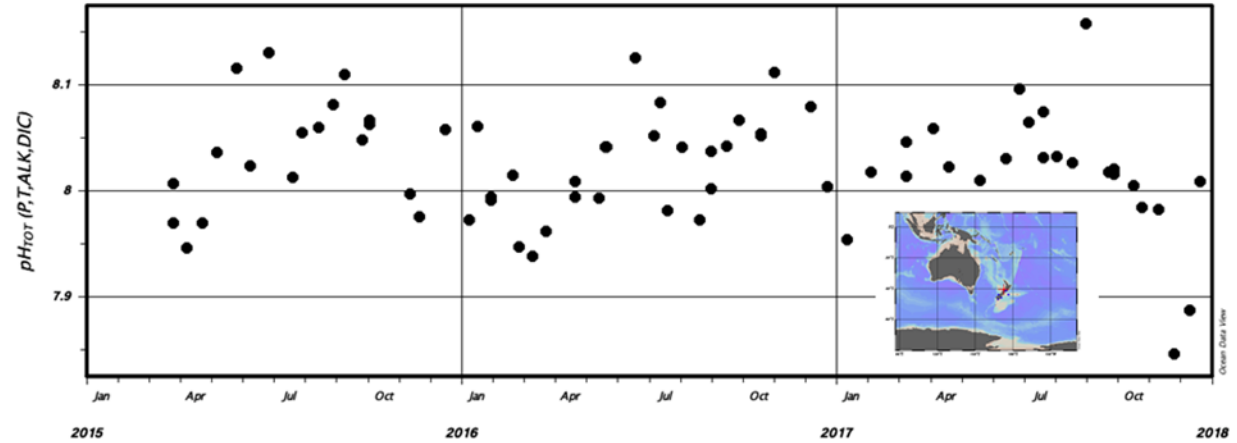


14.3.1 data

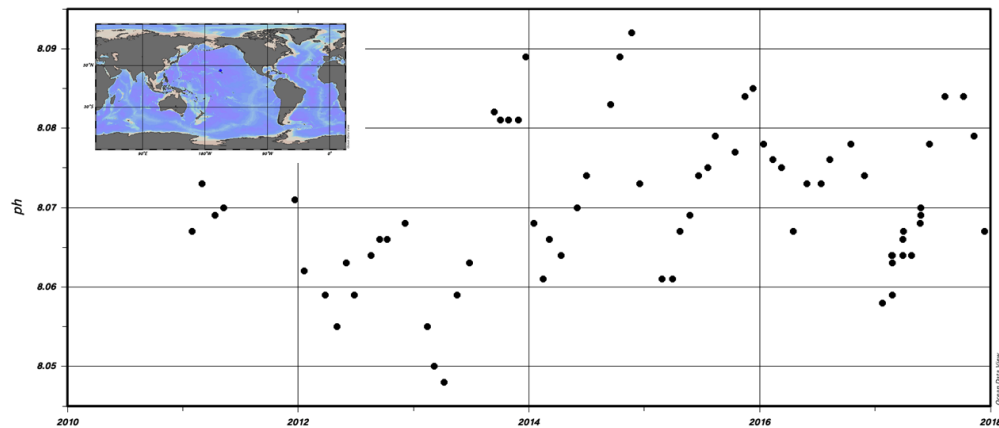
Grays Reef – USA, 2014-2015



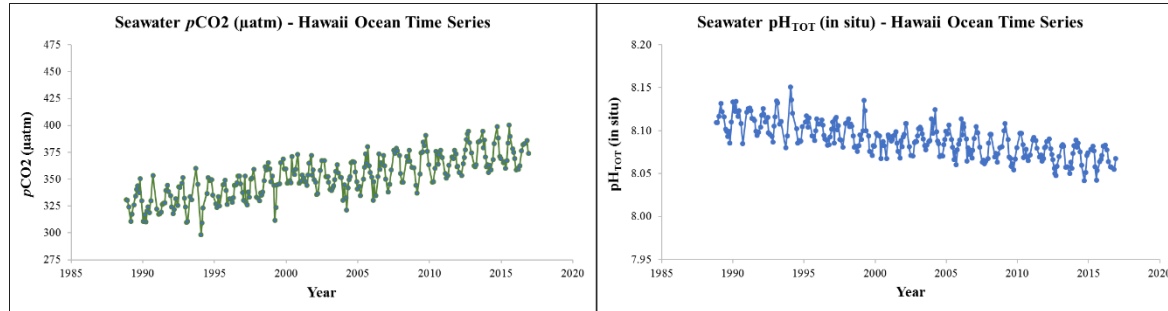
Tasman Bay – New Zealand, 2015-2017



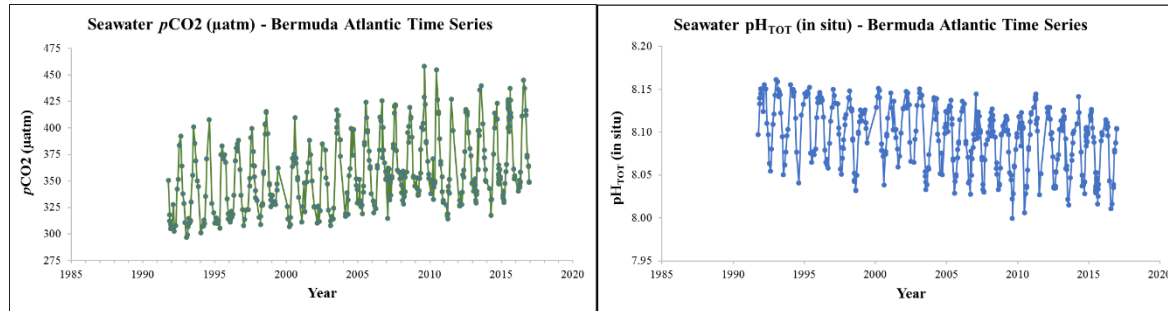
HOTS – USA, 2010-2018



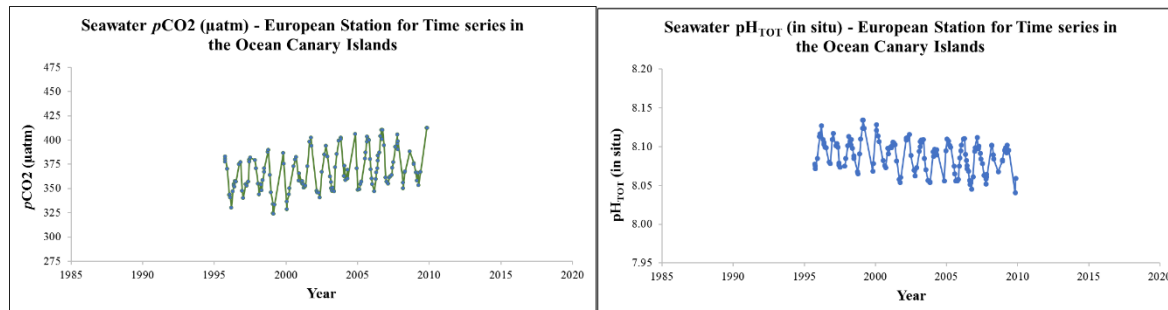
14.3.1 data



pCO₂ and pH records from the Hawaii Ocean Time Series (HOTS) in the Pacific Ocean.



pCO₂ and pH records from the Bermuda Atlantic Time Series (BATS).



pCO₂ and pH records from the European Station for Time series in the Ocean Canary Islands (ESTOC).

Year	Annual equally weighted mean pH		
	HOTS	BATS	ESTOC
1989	8.108		
1990	8.119		
1991	8.111	8.113	
1992	8.107	8.118	
1993	8.110	8.125	
1994	8.107	8.115	
1995	8.104	8.105	8.077
1996	8.096	8.105	8.104
1997	8.100	8.095	8.090
1998	8.094	8.114	8.094
1999	8.095	8.102	8.110
2000	8.087	8.106	8.099
2001	8.087	8.112	8.088
2002	8.089	8.090	8.093
2003	8.093	8.101	8.086
2004	8.091	8.094	8.088
2005	8.083	8.084	8.080
2006	8.087	8.087	8.077
2007	8.077	8.090	8.080
2008	8.079	8.082	8.087
2009	8.076	8.087	8.083
2010	8.078	8.110	
2011	8.078	8.085	
2012	8.068	8.086	
2013	8.069	8.085	
2014	8.071	8.070	
2015	8.067	8.081	
2016	8.070	8.133	
Annual average change pH	0.0017	0.0017	0.001

SDG indicator 14.3.1 ROADMAP:

January 2019	request for 14.3.1 data to NODCs and international repositories (identified via GOA-ON data survey)
18-22 February 2019	IODE 25 – presentation of 14.3.1 data repository proposal to IODE members (include NODCs)
February/March 2019	Submission of 14.3.1 data to UN DESA
April 2019	Online data repository beta version
June 2019	Publication of 14.3.1 cookbook
June/July 2019	request for 14.3.1 data to NODCs ADUs and international data repositories using the cookbook and data repository

Training courses/Workshops:

- Include in Latin American OA Symposium/Workshop January 2019
- Include in WIOMSA OA course (February/March 2019 dates tbc)
- Ocean Teacher 14.3.1. dedicated 14.3.1 workshop (April 2019)