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

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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**
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), pCO$_2$ (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 pCO$_2$ [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).
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

HOTS – USA, 2010-2018

Tasman Bay – New Zealand, 2015-2017
14.3.1 data

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

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<thead>
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<th>Year</th>
<th>Annual equally weighted mean pH</th>
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<td>2016</td>
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Annual average change pH: 0.0017

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).
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)