United Nations Educational, Scientific and Cultural Organization

Intergovernmental Oceanographic Commission

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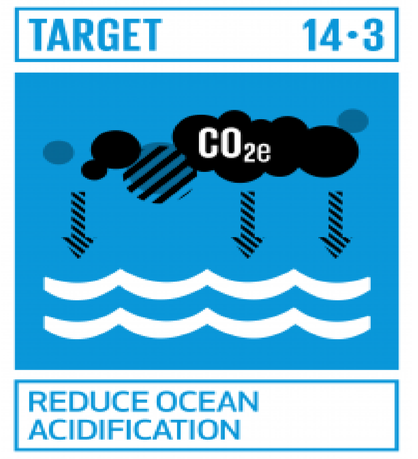
Ocean Acidification
Aligning the SDG and Global Climate Observing Indicators

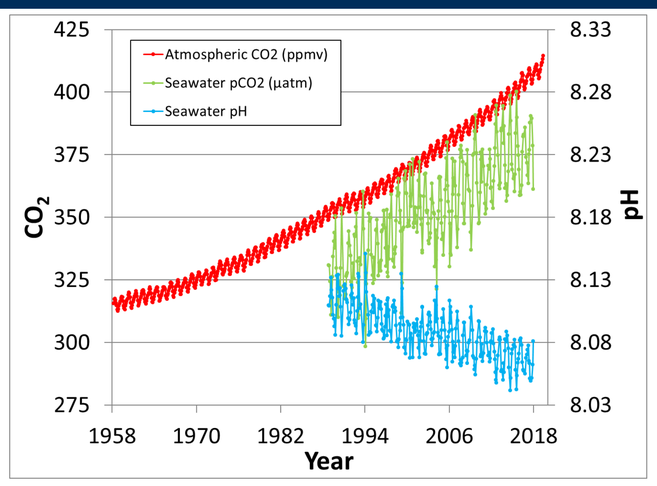
Schoo, K.L., Isensee, K. (IOC-UNESCO) and Global Ocean Acidification Observing Network (GOA-ON)
k.isensee@unesco.org

In 2015, the United Nations adopted the 2030 Agenda, a plan of action for People, Planet and Prosperity, with its 17 **Sustainable Development Goals** (SDG). These include a Goal dedicated to the Ocean, SDG 14, which calls to 'conserve and sustainably use the oceans, seas and marine resources for sustainable development'. SDG Target 14.3 addresses **Ocean Acidification**.

The **SDG 14.3.1 Indicator** calls for the ***Average marine acidity (pH) measured at agreed suite of representative sampling stations*** and the **SDG 14.3.1 Indicator Methodology,** under the custodianship of **IOC-UNESCO**, provides guidance on how to observe ocean acidification to enable global comparisons of the changes in ocean chemistry.



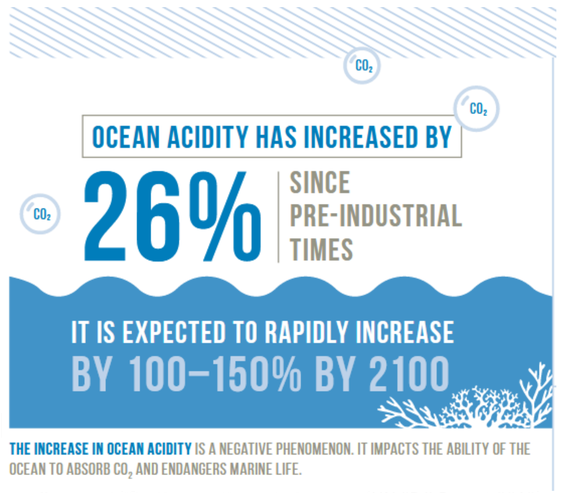
Ocean Acidification



Atmospheric and seawater CO_2 concentrations, and seawater pH from Hawaii, North Pacific, 1958–2019. (NOAA PMEL Carbon Program)

Ocean acidification refers to a reduction in the pH of the ocean, along with associated changes in the ocean carbonate chemistry, caused by the uptake of **carbon dioxide (CO_2)** from the atmosphere. This **inorganic carbon** in the ocean (dissolved inorganic carbon) is one of four variables relevant to observe ocean acidification and determine the rate of change in ocean chemistry. The ocean's pH has decreased by 26% since the beginning of the Industrial revolution.

The **SDG 14.3.1 Indicator Methodology** describes how to measure and report the key carbonate chemistry variables for ocean acidification to enable the global comparison of ocean acidification. These data allow measures of variability and rates of change in ocean acidification from coastal to open ocean regions. Informed adaptation and mitigation strategies to lessen the impact of ocean acidification depend on reliable observations.



Ocean acidification continues to increase (UN SDG Report 2019)

Essential Variables

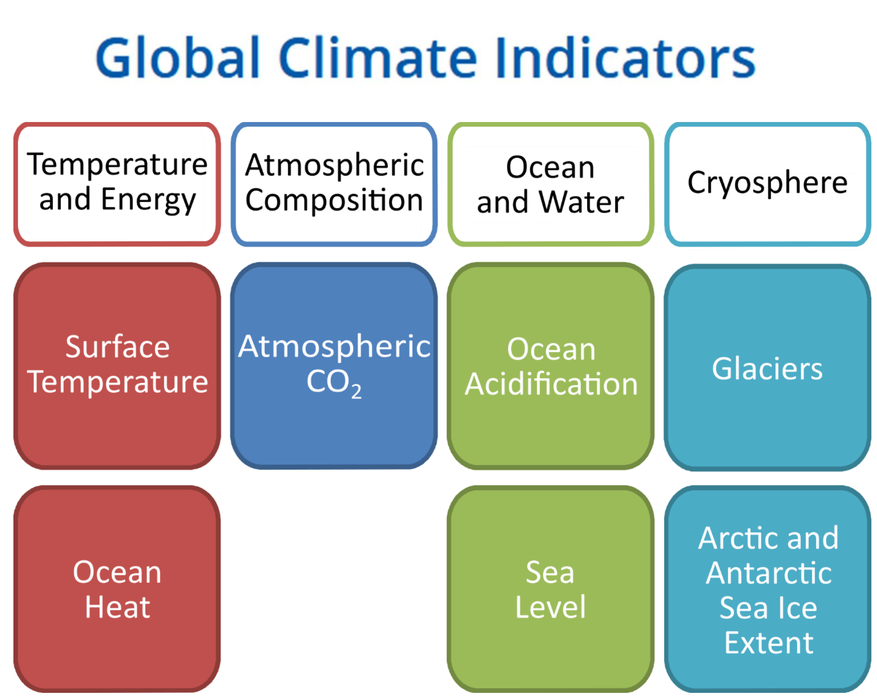
The carbon chemistry variables included under the **SDG 14.3.1 Indicator** for the measurement of **ocean acidification** follow the scientific consensus and are in alignment with essential climate variables.

Dissolved Inorganic Carbon is a **GCOS Essential Climate Variable,** required to support the work of the **UNFCCC** and the **IPCC**.

Inorganic Carbon is also a **GOOS Essential Ocean Variable** and includes the four main variables that are used to determine ocean acidification: dissolved inorganic carbon, pH, carbon dioxide partial pressure (pCO_2), and total Alkalinity.

The **Essential Climate Variables** and **Essential Ocean Variables** form the basis of the **Global Climate Indicators,** established by scientists in a process led by GCOS and adopted by the World Meteorological Organisation (WMO). The **Global Climate Indicators** contain key information for the most relevant areas of climate change, thereby describing the changing climate without reducing it to temperature. **Ocean acidification** is one of the Global Climate Indicators.

Together, these **Variables** and **Indicators** ensure that definitions, measurements and reporting mechanisms are aligned, to provide an optimal global overview of the changing climate in all domains, including changes in ocean acidification.



The Global Climate Indicators, established by the scientific community, inform the Statement on the State of the Global Climate Report and the work of the UNFCCC

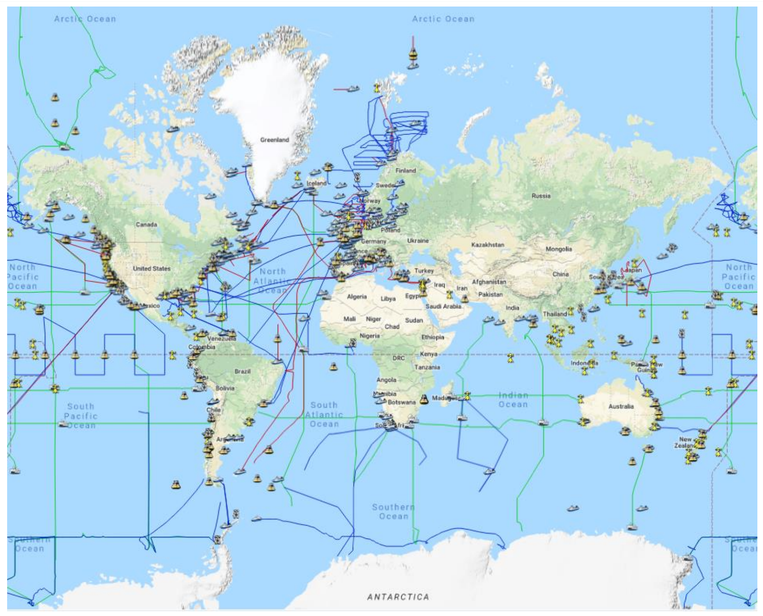
Global Ocean Acidification Observations

The **Global Ocean Acidification Observing Network (GOA-ON)** connects scientists studying the status and progress of ocean acidification. **GOA-ON** supports ocean acidification observations through capacity development and training workshops, provides guidance on best practices for observations and enables access to ocean acidification data from around the world via its data portal.

Through GOA-ON's 7 **Regional Hubs**, researchers cooperate to assess ocean acidification at relevant local scales, coordinate research, exchange information and support training and education.

GOA-ON has been instrumental in the development of the **SDG 14.3.1 Indicator Methodology** and continues to incorporate the methods used in its global training workshops. **IOC-UNESCO**, with support from **GOA-ON,** reports on ocean acidification for the **Global Climate Indicators** and the yearly **Statement on the State of the Global Climate**.

GOA-ON, its partners and its 7 Regional Hubs support the alignment of ocean acidification reporting mechanisms.



The GOA-ON Data Portal visualises ocean acidification observations and links to the data sources

For more information on the SDG 14.3.1 Methodology and the Global Ocean Acidification Observing Network (GOA-ON), visit www.goa-on.org