The Copernicus Marine Service in support of the Sustainable Development Goals

Marine Monitoring

Karina von Schuckmann
Mercator Ocean International

European Commission | Copernicus Europe's eyes on Earth

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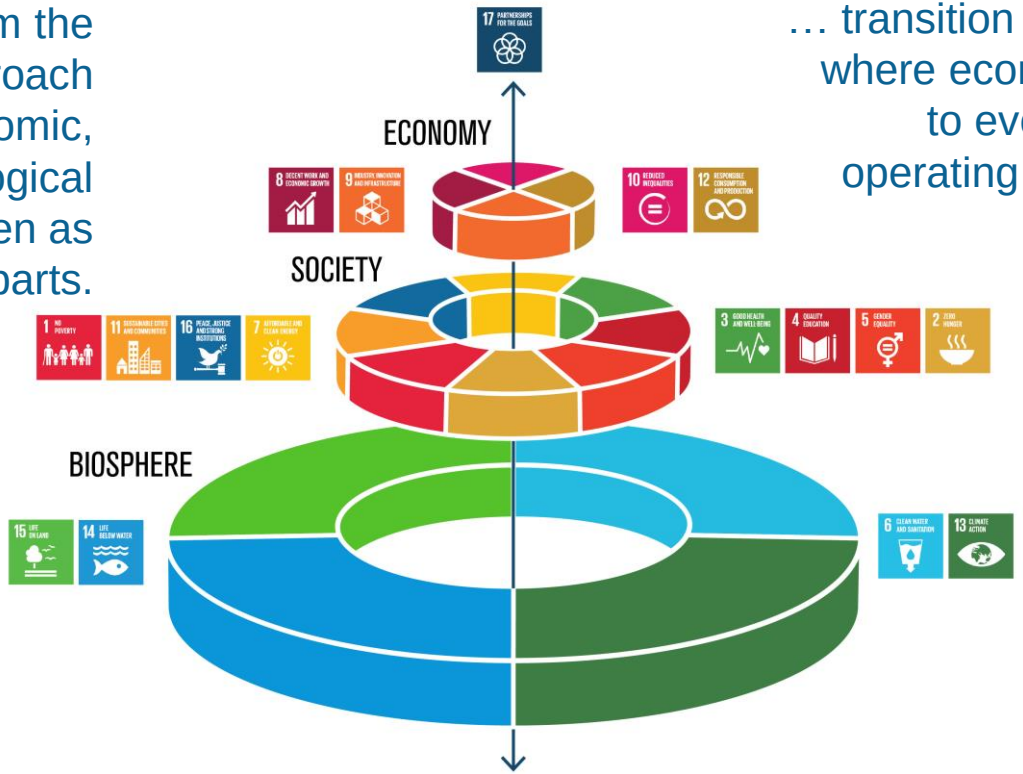
The wedding cake presentation for the SDGs

Marine Monitoring

Sustainable Development Goals: Economies and societies are embedded parts of the Earth system

… moving away from the current sectorial approach where social, economic, and ecological development are seen as separate parts.



… transition toward a world logic where economy serves society to evolves within the safe operating space of the planet.

http://www.stockholmresilience.org

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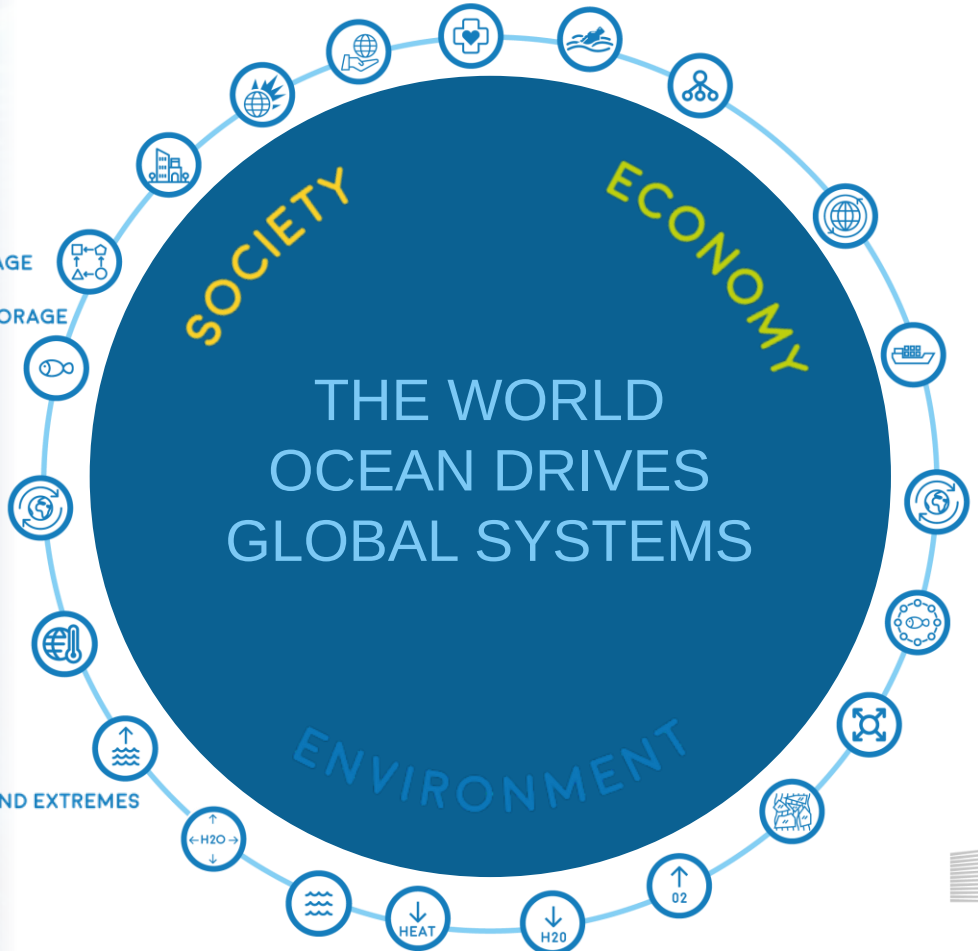
Graphics by Jerker Lokrantz/Azote

The world ocean plays a key role in the Earth system

Marine Monitoring



- HEAT UPTAKE & STORAGE
- CARBON UPTAKE & STORAGE
- OCEAN CURRENTS
- O2 RESERVOIR
- H2O RESERVOIR
- BIODIVERSITY
- SEA LEVEL
- SEA ICE
- OCEAN SPACE
- EARTH SYSTEM
- CLIMATE, WEATHER AND EXTREMES

- FOOD SECURITY
- ADAPTATION, MITIGATION
- URBAN AND REGIONAL PLANNING
- DISASTER RISK MANAGEMENT
- ENVIRONMENTAL PROTECTION
- PUBLIC HEALTH AND RECREATION
- MARINE POLLUTION AND WASTE DUMPING GROUND
- OCEAN GOVERNANCE AND LEGAL FRAMEWORKS
- BLUE ECONOMY
- TRADE AND SHIPPING

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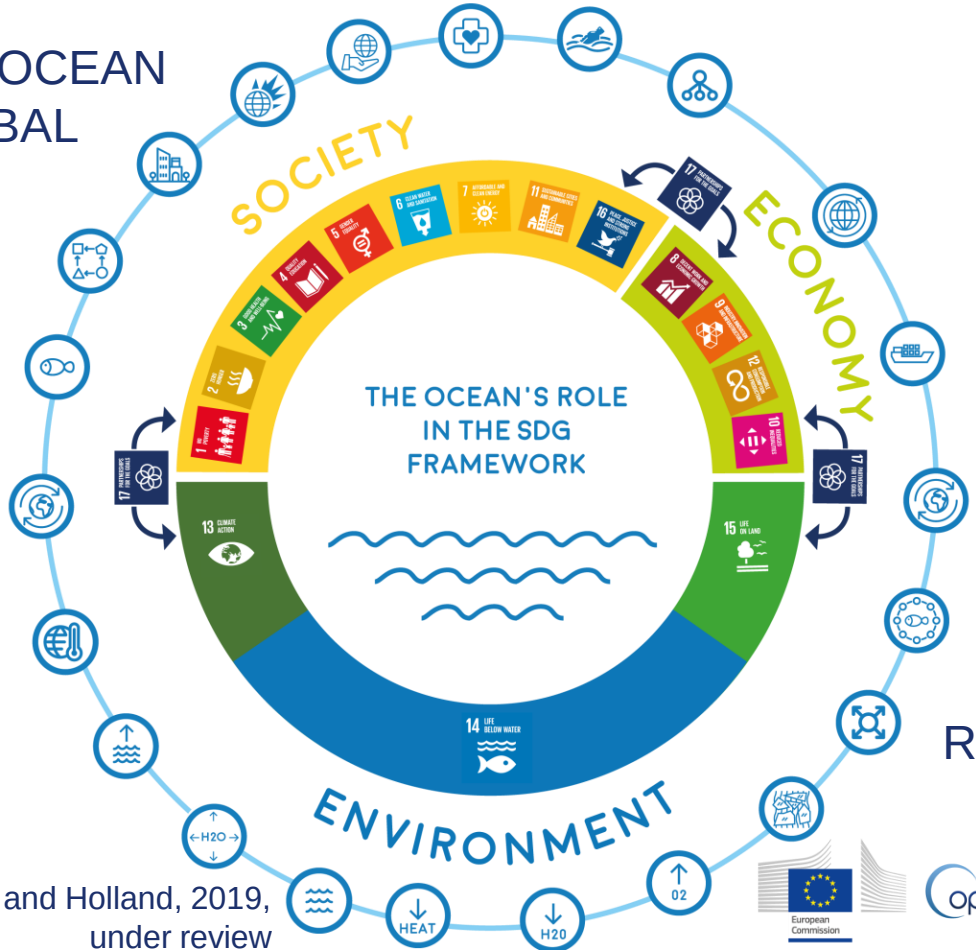
The oceans role in the SDG framwork

Marine Monitoring

THE WORLD OCEAN DRIVES GLOBAL SYSTEMS...



... AND PLAYS A FUNDAMENTAL ROLE IN THE SDG FRAMEWORK

von Schuckmann and Holland, 2019, under review

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Marine Monitoring

Increasing & pressing ocean monitoring needs

… recognized at the highest levels

SUSTAINABLE DEVELOPMENT GOALS

G7 2018 CHARLEVOIX

G7 INITIATIVE ON EARTH OBSERVATION AND INTEGRATED COASTAL ZONE MANAGEMENT

CHARLEVOIX BLUEPRINT FOR **HEALTHY OCEANS, SEAS AND RESILIENT COASTAL COMMUNITIES**

OCEAN PLASTICS CHARTER

G7 Science and Technology Ministers' Meeting Tsukuba, Ibaraki

Tsukuba Communiqué
G7 Science and Technology Ministers' Meeting in Tsukuba, Ibaraki
15-17 May 2016

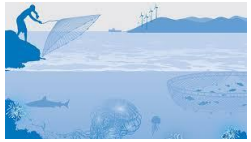
IPCC climate change

GEO

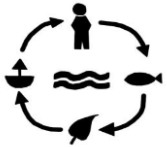
European Environment Agency

To understand and predict the evolution of our weather and climate

For an increasing number of ocean services and the development of the blue economy



Better and sustainable management of the oceans and its resources.



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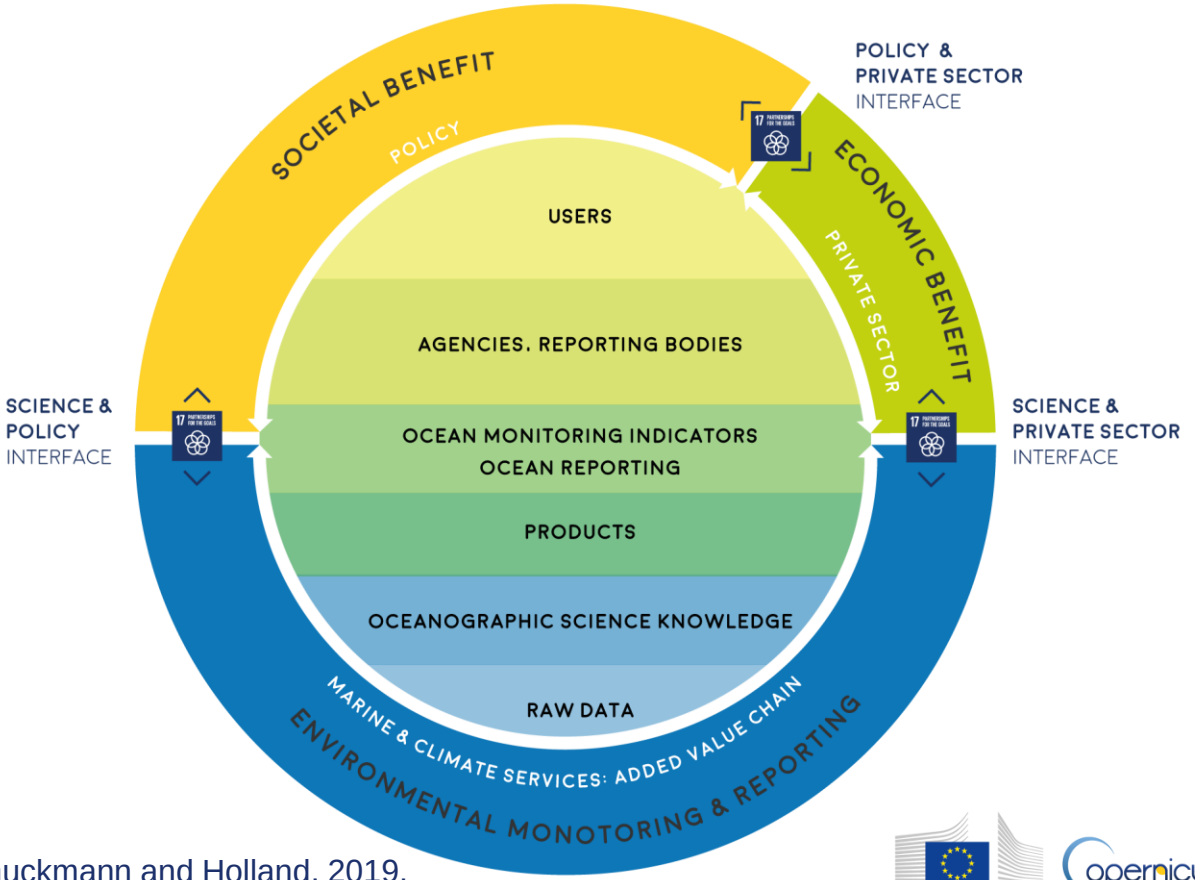
Added value chain: high value for the SDG framework



von Schuckmann and Holland, 2019, under review

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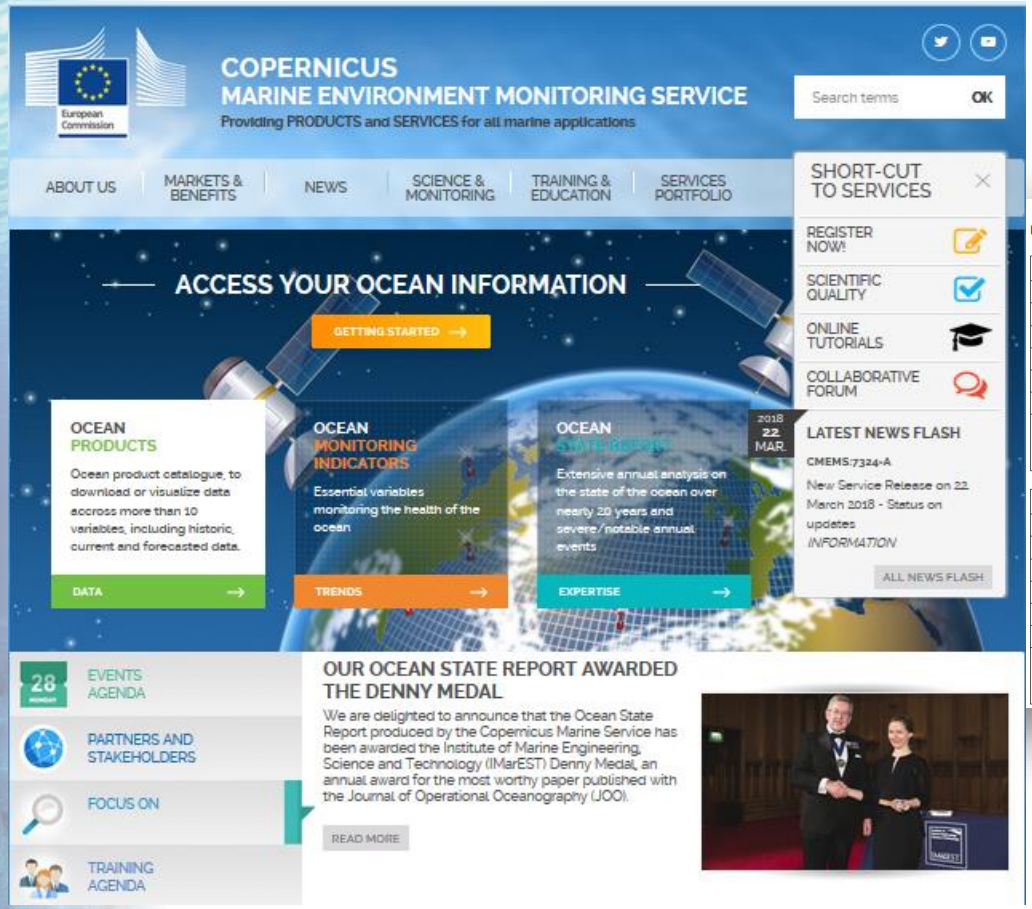
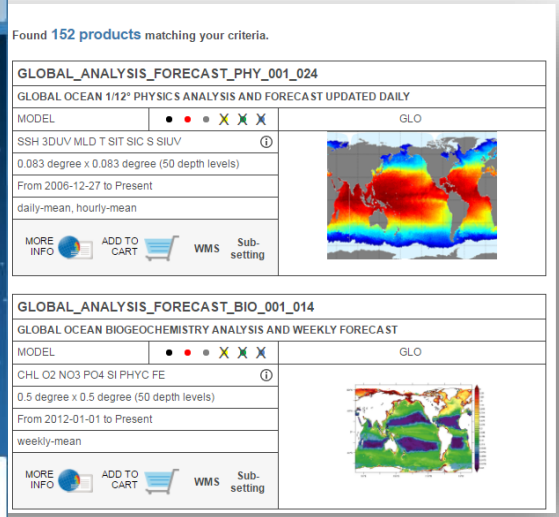
http://marine.copernicus.eu





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Mercator Ocean International: entrusted entity

Marine Monitoring

Team: ~80 persons

A non-for-profit company with a European governance

Ocean forecasters

. Developing global Ocean 3D models
. Running operational marine forecasts
. Delivering public interest service

Based in Toulouse, France

Entrusted by EU for CMEMS

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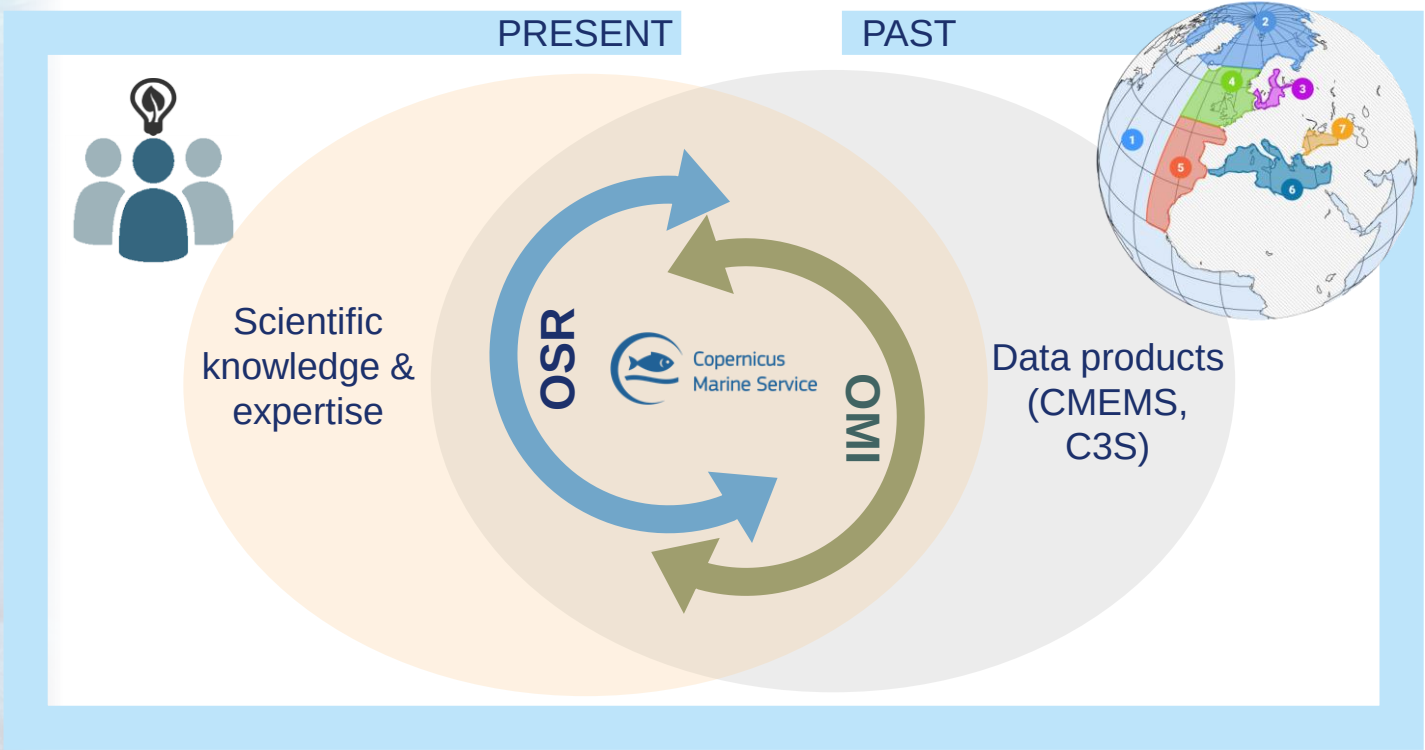
Copernicus Marine Ocean Reporting

Marine Monitoring

Objective: Develop a fundamental source of Copernicus Marine value-added information and indicators for the reporting of the European regional seas and the global ocean state, variability and change from the past to the present.



The Copernicus Marine Ocean State Report

Marine Monitoring

- Collaboration of more than 100 scientific experts
- Collaboration of more than 25 European institutions
- Fundamental step forward into the development of regular Copernicus Marine Service regular reporting

Scientific community

Policy and decision makers, Blue Economy

European and international agencies and organisations, Regional Sea Conventions

General public awareness

http://marine.copernicus.eu/science-learning/ocean-state-report/

The Copernicus Marine Ocean State Report

ISSUE #1:

- Published in the Journal of Operational Oceanography: Open access
- Summary for policy makers
- Mentioned as Copernicus achievement 2017
- Chair & team medal award
- More than 8000 views since publication

ISSUE #2:

- Published in the Journal of Operational Oceanography: Open access
- Summary for policy makers
- More than 8000 views since publication

ISSUE #3:

- Revision process

ISSUE #4:

- Draft development

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MERCATOR OCEAN INTERNATIONAL

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NEW: Specific task at the science/society & science/economy interface

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The Copernicus Marine Ocean State Report summary

WHITE OCEAN

Over the past quarter of a century sea ice volume and extent have drastically changed across the southern and northern hemisphere polar regions and the Baltic Sea. In 2016, global sea ice melted at a pace far faster than ever observed since our earliest records dating back to the 1980s.

Sea ice extent at record lows in 2016 in both poles.

NORTHERN HEMISPHERE

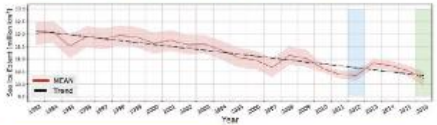
ARCTIC

- -6.2% sea ice extent loss at a rate per decade (1993-2016)
- -780 000 km² per decade of sea ice extent loss (1993-2016) Uncertainty: ± 70 000 km²/decade

Ten of the lowest Arctic summer sea ice extent values took place in the last ten years.*

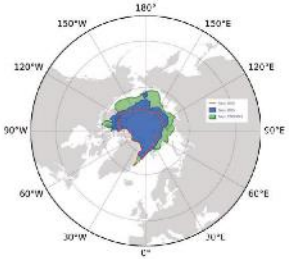
*Even observed on record by satellites

Northern Hemisphere Sea Ice Extent Average by Year



The figure shows the annual mean sea ice extent (1993 to 2016) averaged over the northern hemisphere as expressed in kilometers squared (km²). Evaluated from ocean reanalyses. Source: CMEMS Ocean Monitoring Indicators (OMI) marine. copernicus.eu/science-learning/ocean-monitoring-indicators/catalogue

Since 1993, there has been an accelerated sea ice extent loss of nearly 780 000 km² per decade (with an uncertainty of 70 000 km²/decade) due to contemporary global warming.



SOUTHERN HEMISPHERE

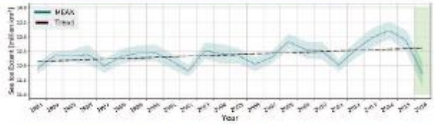
ANTARCTIC

- +1.6 % sea ice extent gain per decade trend (1993-2016)
- +200 000 km² per decade of sea ice extent gain (1993-2016) Uncertainty: ± 100 000 km²/decade

There was a record low sea ice extent in the Antarctic in 2016.*

*Even observed on record by satellites

Southern Hemisphere Sea Ice Extent Average by Year



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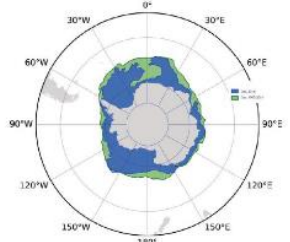
Aside from the large sea ice extent drop in 2016, the Antarctic sea ice extent had been slowly but steadily expanding, with a record high in 2014 that lasted several months. Over the past decades the Antarctic has been growing at a rate of 1.6% sea ice extent increase per decade and by 8.8% sea ice volume increase per decade from 1993 to 2016. Possible reasons for the large contemporary variations of sea ice gains and losses in the Antarctic Ocean can include, for example, changes in ocean hydrography and variations at the air-sea interface such as wind driven processes. Understanding the precise role and interplay between these different processes remains an area of active research.



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The Copernicus Marine Ocean Monitoring Indicators

VISUALISATION

DOCUMENTATION

DATA DISTRIBUTION

http://marine.copernicus.eu/science-learning/ocean-monitoring-indicators/

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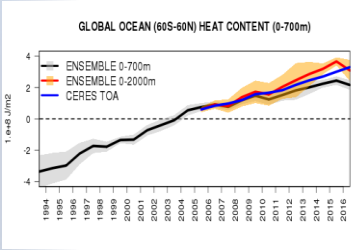
Marine Monitoring

The Copernicus Marine Ocean Monitoring Indicators

IMPLEMENTED SINCE 2018 IN THE CMEMS CATALOGUE

OCEAN HEAT CONTENT

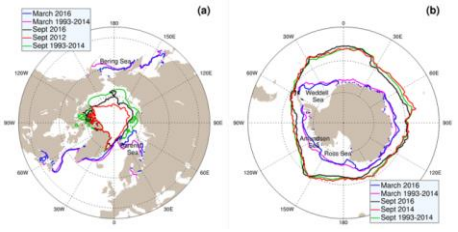


- IPCC
- GCOS in support of UN SDG framework
- Climate research
- Climate variability (e.g. ENSO, hurricanes)

SEA LEVEL

- Agencies
- IPCC & climate science
- Flooding
- Impact on land use
- Coastal erosion

SEA ICE



- Agencies
- IPCC & climate science
- Shipping routes

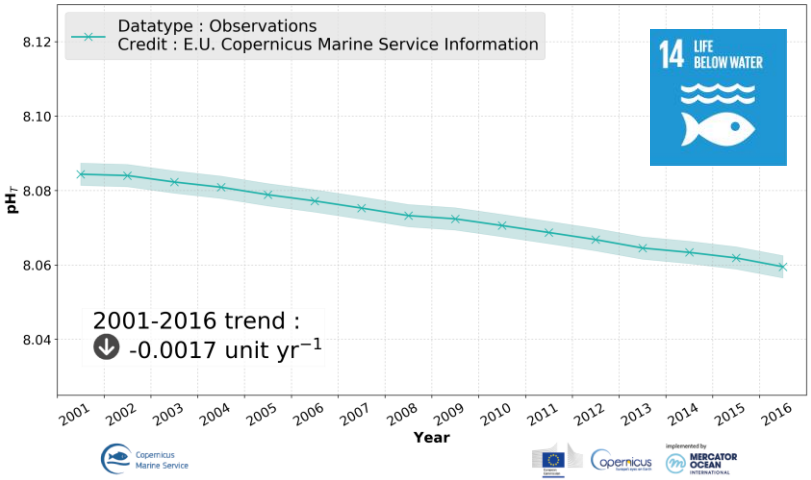
The Copernicus Marine Ocean Monitoring Indicators

Marine Monitoring

NEXT STEPS …

OCEAN ACIDIFICATION

Yearly Mean Surface Sea Water pH reported on total scale



- OCEAN HEALTH
- OCEAN TEMP. & SAL.
- CLIMATE VARIABILITY
- NORTH ATLANTIC MONINTORING
- WATER & HEAT EXCHANGE
- CURRENTS
- EXTREME EVENTS

FOSTER GLOBAL INITIATIVES

Marine Monitoring

CMEMS side event at the first UN Ocean Conference.

CMEMS Ocean PH and acidity to be used at EU reporting from end 2018/2019 onward (Eurostat).

CMEMS leadership for operational oceanography recognized by GEO sec.

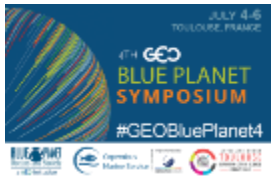
CMEMS to foster deep integration and visibility in GEO Work Programme (Blue Planet , EuroGEOSS/GEOSS)

CMEMS involved in the strong upstream observation network coordinated by Intergov. Ocean Commission

CMEMS involved in IOC Outreach activities.

CMEMS contributor to OECD SPACE and OCEAN WORKSHOPS related to INNOVATION and VALUING OCEAN OBSERVATION

CMEMS Ocean Monitoring Indicators and scientific expertise



Marine Monitoring

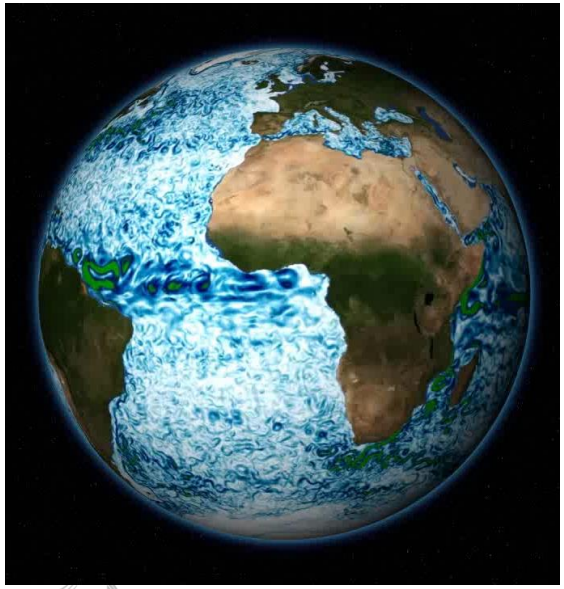
THANK YOU

Knowing more about :

the program **copernicus.eu**

the service **marine.copernicus.eu**

the entrusted entity **mercator-ocean.eu**



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Contact : servicedesk.cmems@mercator-ocean.eu

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