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MERCATOR OCEAN AND CMEMS IN SUPPORT TO TARA EXPEDITION

L. CROSNIER, 24 NOVEMBRE 2017





TARA PACIFIC EXPEDITION



The screenshot shows the Tara Expeditions website. At the top, there is a navigation bar with the Tara Expeditions logo, the name 'agnès b.', and social media icons for Facebook, Twitter, YouTube, Instagram, and LinkedIn. Below the navigation bar, there are menu items: ABOUT TARA, SCIENCE, ENVIRONMENT, EDUCATION, ART, AGENDA, SUPPORT TARA, and a 'MAKE A DONATION' button. The main content area features a large image of a coral reef with the headline 'TARA PACIFIC FOCUSES ON CORALS : FROM POLYP TO REEF'. To the left of the main image is a sidebar with categories: OCEAN & MANKIND, OCEAN & BIODIVERSITY, OCEAN & CLIMATE, and TARA'S ADVOCACY FOR THE OCEAN. Below the main image are social media sharing icons for Twitter, Facebook, and Google+. At the bottom of the screenshot, there is a text block that reads: 'TARA'S NEW EXPEDITION IN THE PACIFIC OCEAN IS CURRENTLY BEING PREPARED. WHILE THE CREW GETS READY TO SET SAIL FOR THE CORAL REEFS, SCIENTISTS ARE FINALIZING THE RESEARCH PROTOCOL. BEFORE THEIR DEPARTURE, LET'S SUMMARIZE WHAT IS KNOWN ABOUT CORAL THIS MEANS DIVING INTO THE COMPLEX WORLD OF POLYPS AND LIMESTONE THAT FORM THE HIGF'.

Tara's 2016-2018 expedition in the Pacific Ocean is going on. This expedition focuses on the resilience of corals and their adaptation to change in the Pacific Ocean.

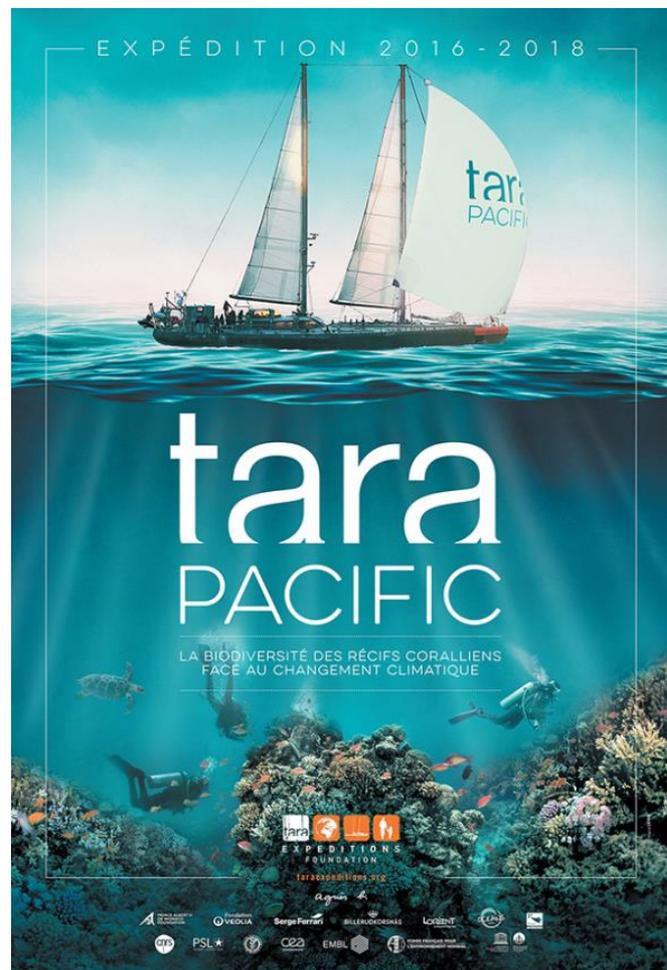


MERCATOR OCEAN' SERVICE TO TARA



Mercator Océan délivre quotidiennement des produits globaux, sous formes de cartes et de fichiers numériques, issus de ses propres systèmes et de l'information produite en temps réel par le Copernicus Marine Service:

- sur l'état physique de l'océan (température, salinité, courants et élévation du niveau de la mer).
- sur la biogéochimie de l'océan (les concentrations de chlorophylle, oxygène, nitrate, phosphate, silicate, fer, phytoplancton...)
- Des indicateurs sur le blanchiment de corail pour chaque île visitée par Tara, ceci, au plus proche du temps réel.





DEFINITION OF INDICATOR



Corals are sensitive to temperatures warmer than the bleaching threshold, 1°C above the highest summertime mean SST.

Scientists have shown that corals start to become stressed when the Sea Surface Temperature (SST) is 1°C warmer than the highest monthly mean temperature (Glynn and D'Croze, 1990).



DEFINITION OF INDICATOR (from NOAA)



Thermal or heat stress is the main cause of mass coral bleaching.

Heat stress will build up if the temperature around the corals stays above the bleaching threshold over time.

Need to measure not only how far the temperature is above the threshold, but how long it has stayed above that point.

This is what the **Degree Heating Week (DHW) indicator** was designed to portray.

Source: Coral Reef Watch (CRW) program, part of the [U.S. National Oceanic and Atmospheric Administration](#) (**NOAA**)

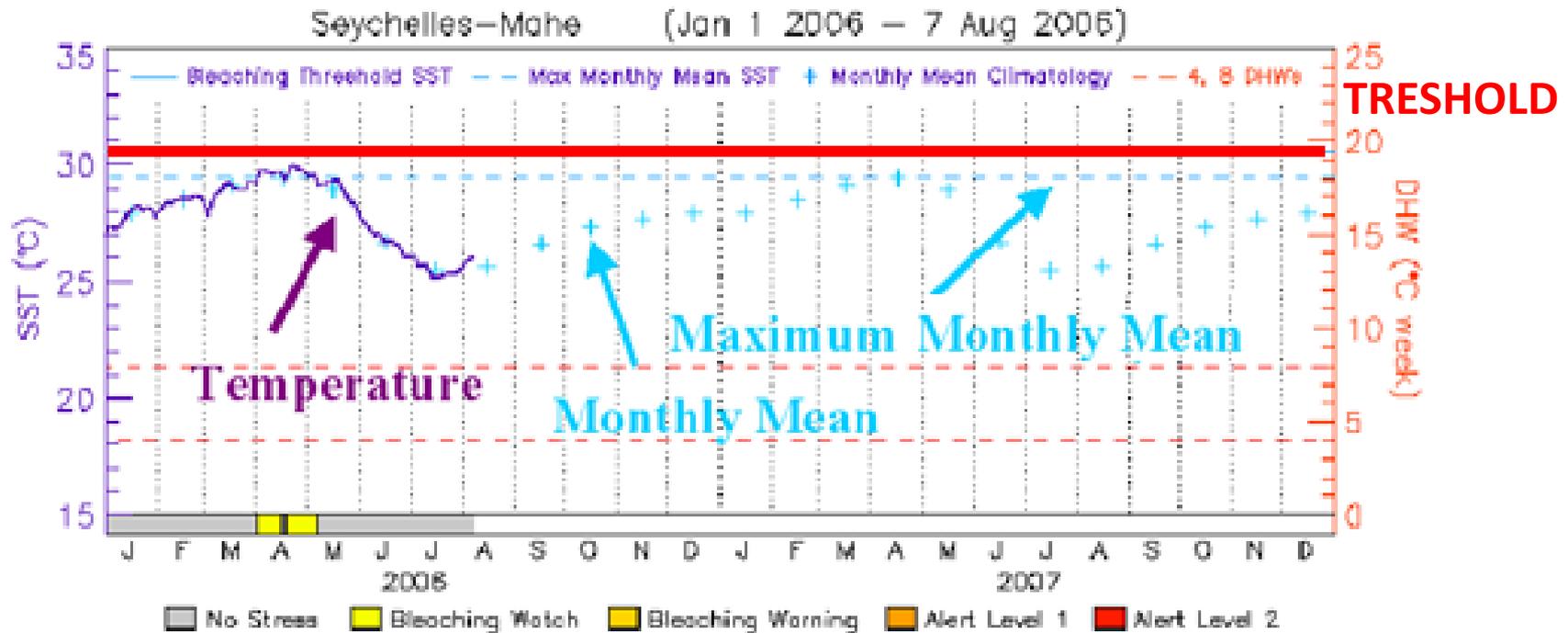


DWH INDICATOR CAN BE COMPUTED FROM CMEMS DATA

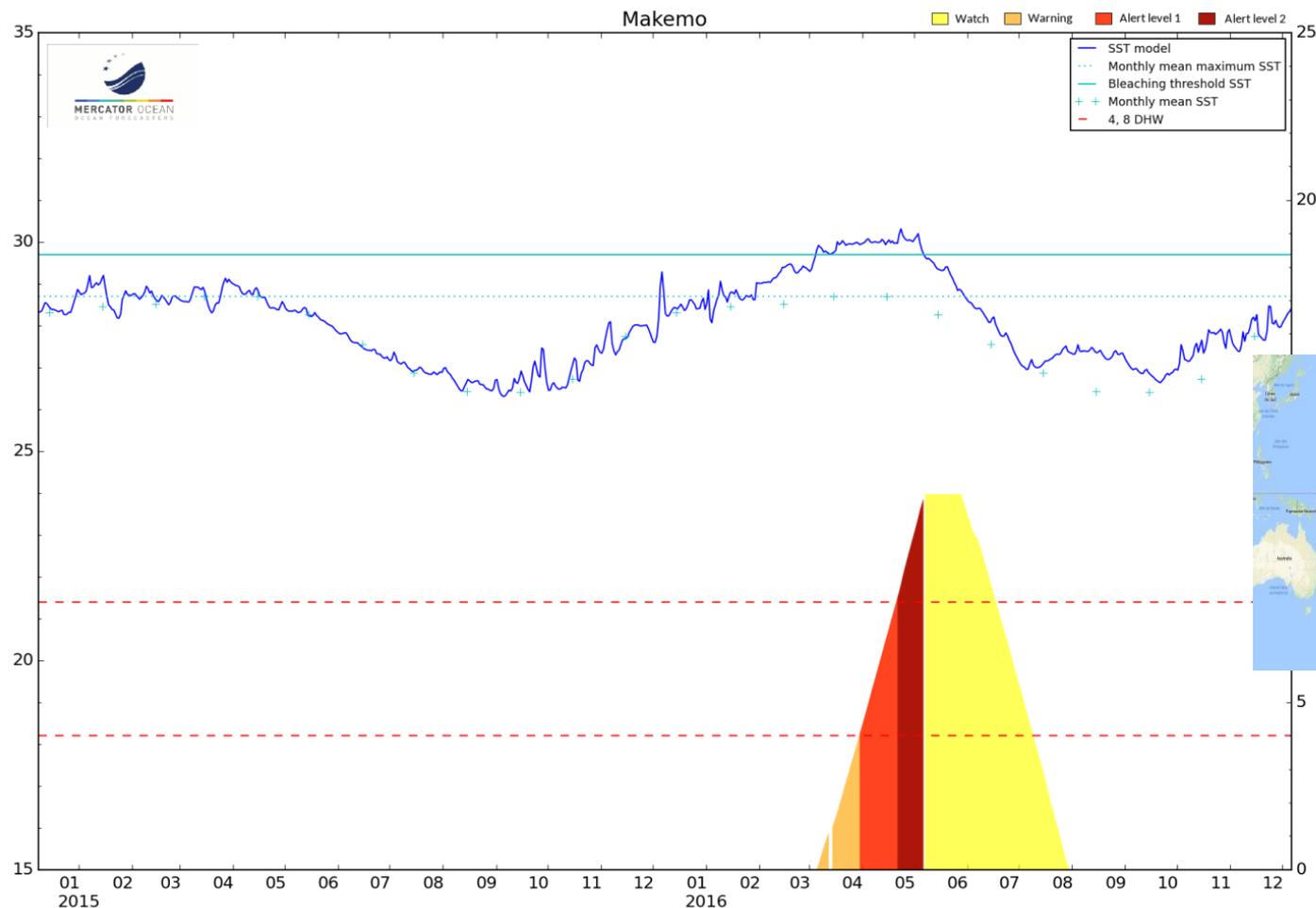


DWH INDICATOR CAN BE COMPUTED FROM CMEMS DATA:

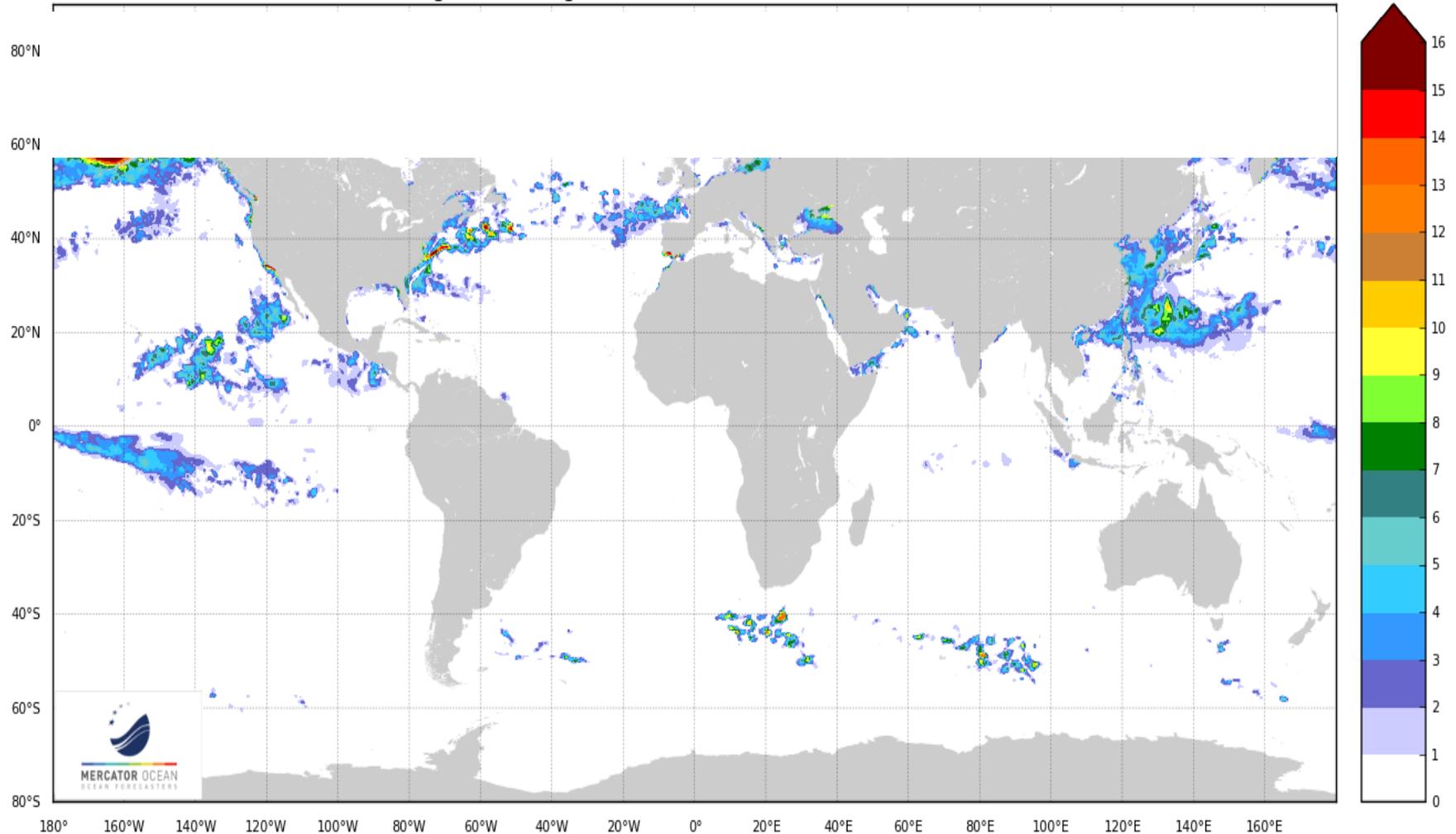
- Using Daily 5-km Satellite Sea Surface Temperature Product [here](#)
- Using Daily 7-km Global Ocean Model Product [including 10-day forecast here](#)



When the SST is warmer than the bleaching threshold temperature, the corals will experience thermal stress. This thermal stress is the main cause of mass coral bleaching.



Degree Heating Weeks for last 12 weeks - 20160812



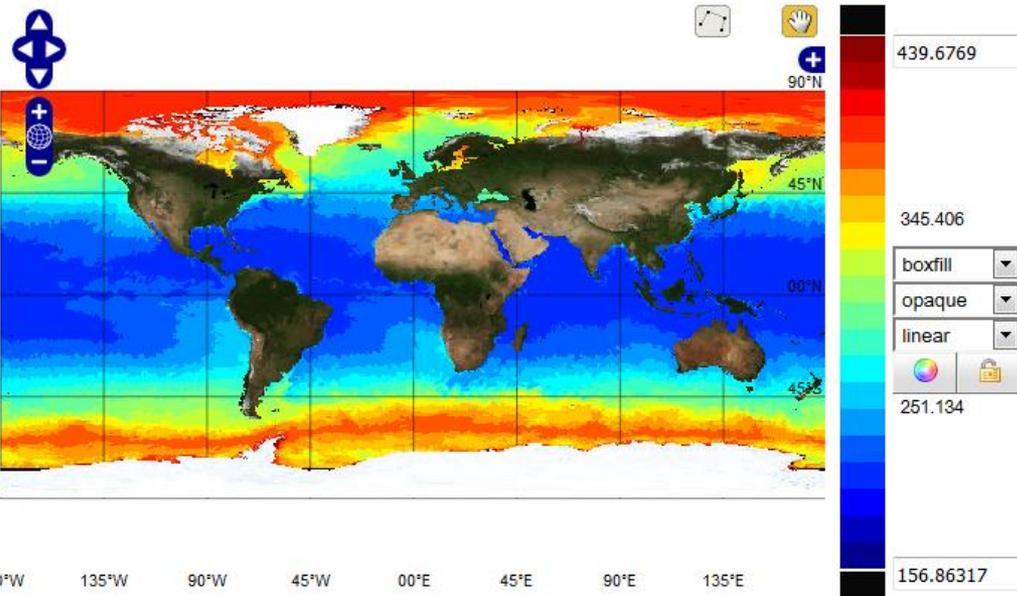
Global Ocean Biogeochemistry Analysis and weekly forecast

Product id: GLOBAL_ANALYSIS_FORECAST_BIO_001_014

Dataset: weekly mean fields from Global Ocean Biogeochemistry Analysis

Variable: mole_concentration_of_dissolved_molecular_oxygen_in_sea_water

Units: mmol/m³ Time: 2017-11-18 12:00:00.000Z Depth (m): -0.49



Oxygène dissous:

- Sur toutes les régions (disponible dès maintenant)

Autres paramètres: Pression partielle de CO₂ dans l'eau

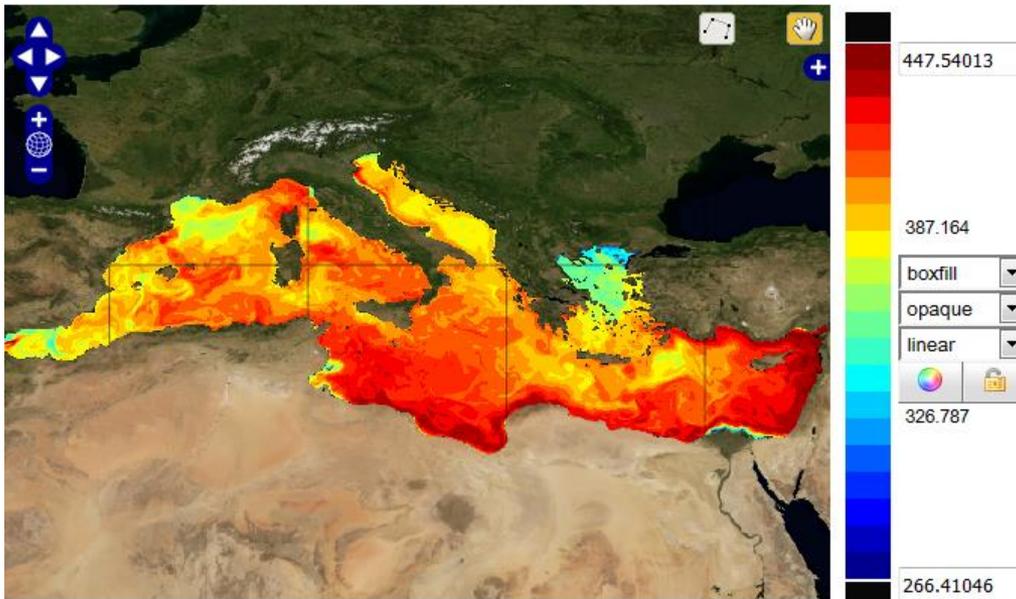
Mediterranean Sea Biogeochemistry Analysis and Forecast

Product id: MEDSEA_ANALYSIS_FORECAST_BIO_006_014

Dataset: Ocean pCO₂ and Ocean Acidity (3D) - Daily Mean

Variable: surface_partial_pressure_of_carbon_dioxide_in_sea_water

Units: Pa Time: 2017-11-14 12:00:00.000Z Depth (m): -1.02



- pCO₂ (Pa): Proportionnel à la quantité de CO₂ dissous dans l'eau
- MED Sea (disponible dès maintenant)
- autres bassins (disponibles dès fin 2018)

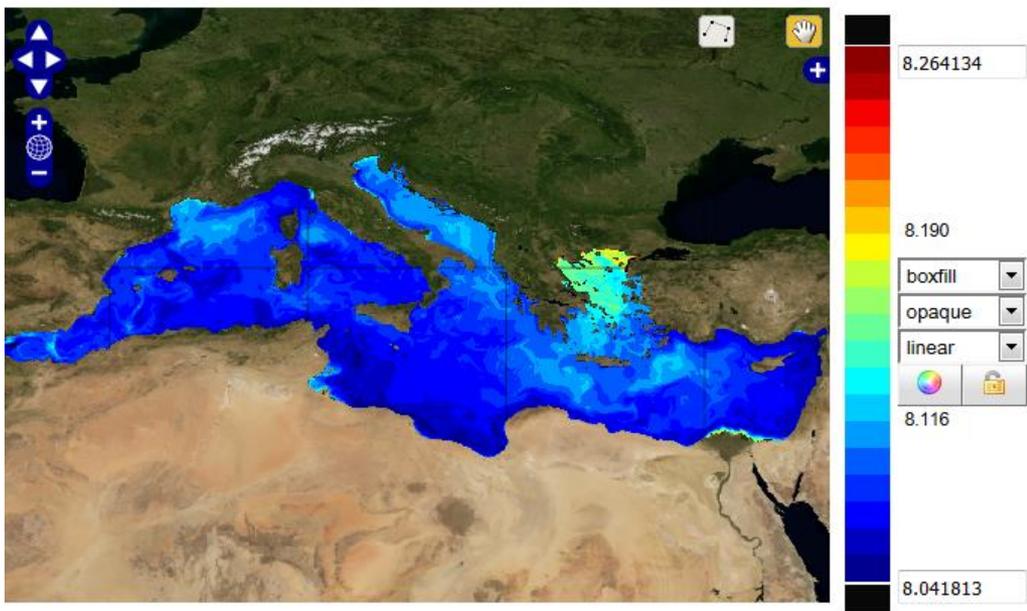
Mediterranean Sea Biogeochemistry Analysis and Forecast 

Product id: MEDSEA_ANALYSIS_FORECAST_BIO_006_014

Dataset:

Variable:

Units: 1 Time: Depth (m):



- PH

- MED Sea (disponible dès maintenant)

- autres bassins (disponibles dès fin 2018)



Conclusion



- **Mercator Océan délivre quotidiennement des produits globaux pour l'expédition TARA Pacific.**
- **De nouveaux produits du Copernicus Marine Service arriveront fin 2018 (ex: acidité des océans) et permettront de mieux répondre aux problématiques de suivi du blanchiment des coraux.**

Annexe: Exemples d'autres outils potentiellement utiles VRE-BLUEBRIDGE



The Protected Area Impact Maps Virtual Research Environment (PAIM VRE) provides the user with tools to visualize, analyze and report on a range of ecologically important seafloor features within marine protected areas - a key component of Maritime Spatial Planning (MSP). The interface is built around an interactive map viewer that provides visualization of a range seafloor features. The interface utilizes cloud computing to analyse the representation of seafloor features within marine protected areas for a selected exclusive economic zone or marine ecoregion.

https://marine.d4science.org/web/protectedareaimpactmaps/home?p_p_state=maximized&p_p_mode=view&saveLastPath=false&_58_struts_action=%2Flogin%2Flogin&p_p_id=58&p_p_lifecycle=0&_58_redirect=%2Fgroup%2Fprotectedareaimpactmaps%2Fmpa-reporting

<https://grid-arendal.maps.arcgis.com/apps/Cascade/index.html?appid=f7a06d0b2f6145aab99d3e97150976ad>

