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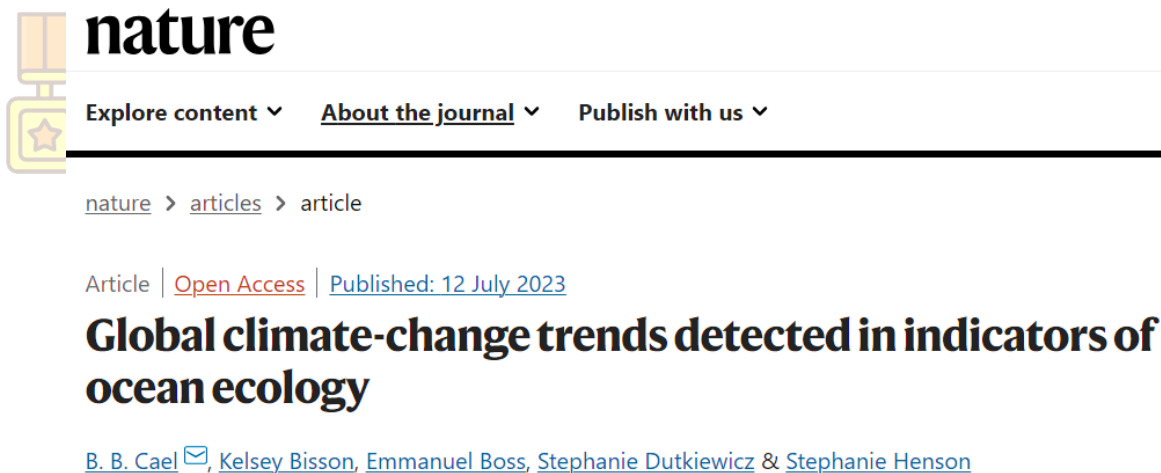
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Climate Change Is Altering The Colour Of The Oceans

Why In The News?

- The **Colour Of The Earth's Oceans** Has Significantly Altered Over The Past Two Decades, Most Likely Due To **Human-induced Climate Change**, According To A New Study. Over **56 Per Cent Of The Oceans**, More Than The Total Land Area On The Planet, Has Experienced The Shift In Colour, It Added.
- The Study, '**Global Climate-change Trends Detected In Indicators Of Ocean Ecology**', Was Published Earlier In July In The **Journal Nature**.
- It Was Carried Out By **BB Cael And Stephanie Henson** Of The United Kingdom Based National Oceanography Centre, **Kelsey Bisson** Of The Oregon State University (USA), **Emmanuel Boss** Of The University Of Maine (USA), And **Stephanie Dutkiewicz** Of The Massachusetts Institute Of Technology (USA).



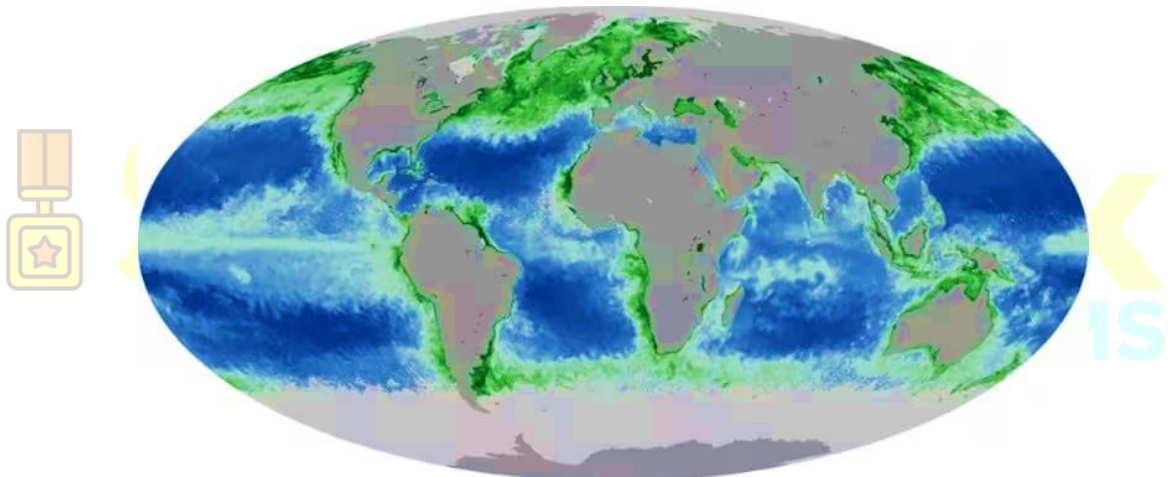
The screenshot shows the top portion of a Nature journal article page. At the top left is the Nature logo, which includes a stylized orange and yellow icon of a laboratory flask or beaker. To the right of the logo is the word "nature" in a bold, lowercase, sans-serif font. Below the logo and title are three navigation links: "Explore content" with a dropdown arrow, "About the journal" with a dropdown arrow, and "Publish with us" with a dropdown arrow. A horizontal line separates these links from the breadcrumb navigation below, which reads "nature > articles > article". Below the breadcrumb is the article's metadata: "Article | [Open Access](#) | [Published: 12 July 2023](#)". The main title of the article, "Global climate-change trends detected in indicators of ocean ecology", is displayed in a large, bold, black font. Below the title is the list of authors: "B. B. Cael" (with an email icon), "Kelsey Bisson", "Emmanuel Boss", "Stephanie Dutkiewicz", and "Stephanie Henson", all in a smaller blue font.

What Do We Know?

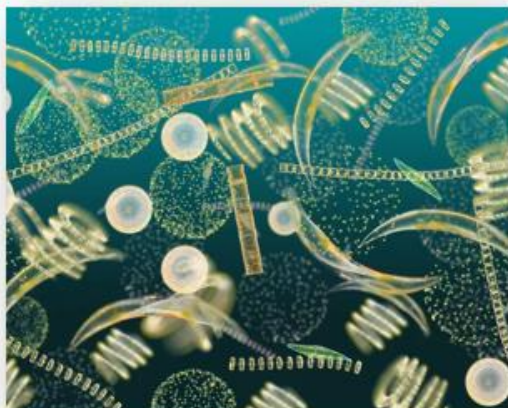
- Although The Change In Colour Of The Oceans **Doesn't Impact Marine Life Directly**, It Indicates That Marine Ecosystems Are In A State Of Flux And They Could Completely Go Out Of Balance In The Future, Severely Affecting Ocean Life And Humans Dependent On Them.
- Changes In These Ecosystems Could Impact How Productive They Are, Which Could, In Turn, Affect How Much **Carbon The Ocean Stores** And How Much **Food Supply There Is For Fisheries**.

What Makes The Oceans Colourful?

- In Most Regions Across The World, The Oceans Appear **Blue Or Navy Blue** For A Reason. This Happens Due To **“The Absorption And Scattering Of Light,”**.
- When The Sunlight Falls On Deep And Clear Water, Colours With Longer Wavelengths, Such As Red, Yellow And Green, Are Absorbed By The Water Molecules But **Blue And Violet, Which Have A Much Shorter Wavelength, Are Reflected Back.**
- But When The Water Isn't Deep Or Clean, An Ocean Can Appear To Be Of A Different Colour. For Instance, Along **Argentina's Coastline**, Where Major Rivers Merge Into The Atlantic Ocean, The **Ocean Exudes A Brown Tint** Because Of Dead Leaves And Sediments Spewing From The Rivers.
- In Other Parts Of The World, **The Oceans Appear Green**, Which Happens Due To The Existence Of Phytoplankton On The Upper Surface Of The Water.

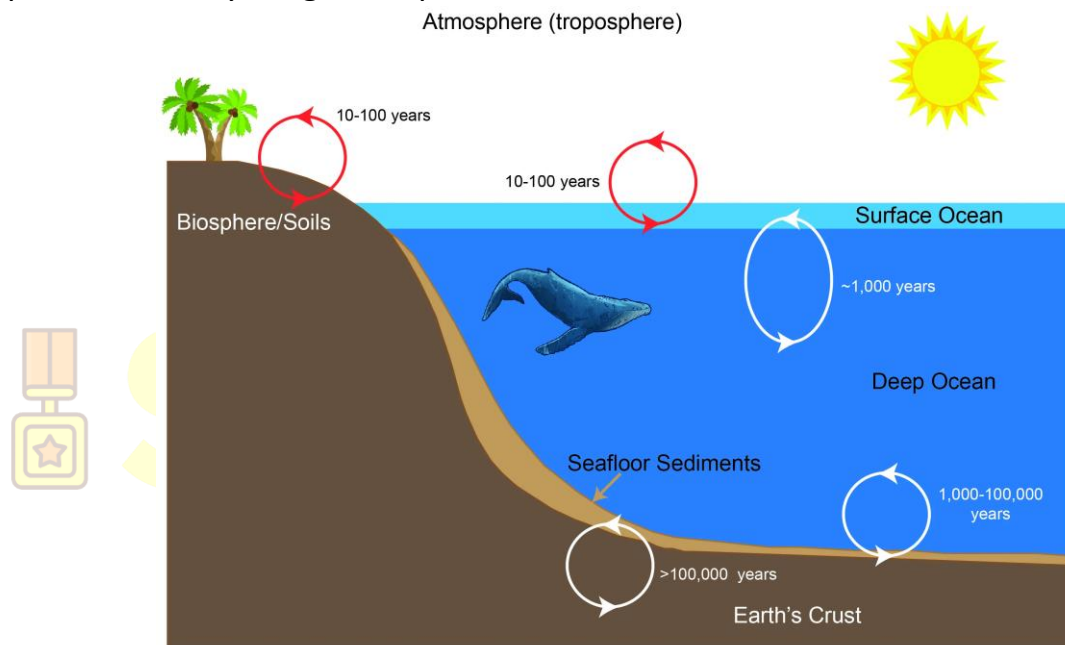


- Phytoplankton Are **Microscopic Marine Algae** That Contain **The Green-coloured Pigment Chlorophyll**. The Pigment Helps Them Absorb Sunlight, Which They Use To Capture Carbon Dioxide From The Atmosphere And Convert It Into Sugars.



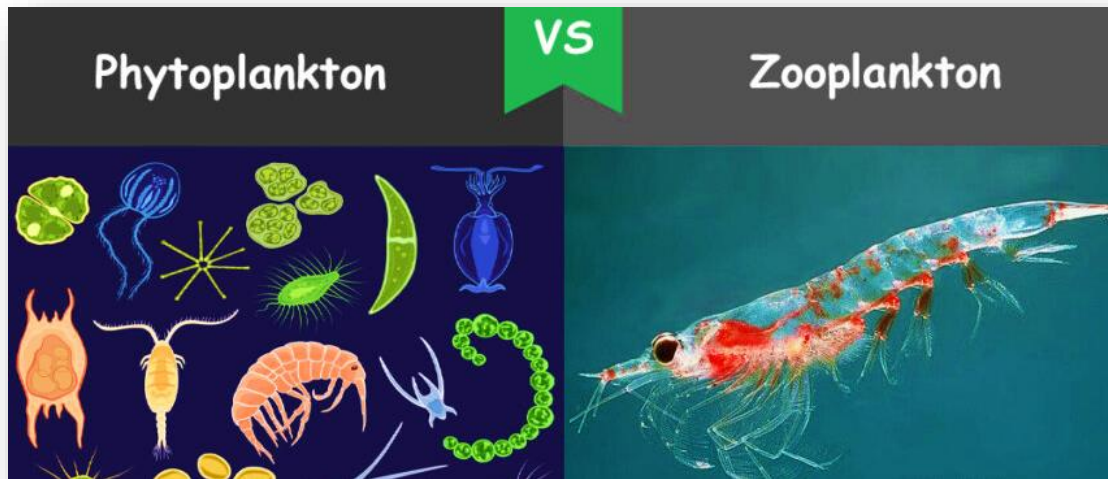
Why Is The Colour Of The Oceans Changing?

- The Study Says One Of The Most Affected Areas Is The **Tropical Ocean Regions**, Near The Equator, Where The Water Is **Turning From Blue To Green**. But This Doesn't Mean That The Rest Of The Affected Areas Are Also Turning Greener.
- The Findings Suggest That A Shift In Colour Is Happening In Those Regions Where The Oceans Are Getting More **Stratified**.
- **Ocean Stratification** Is The Natural Separation Of An Ocean's Water Into Horizontal Layers By Density, With Warmer, Lighter, Less Salty, And Nutrient-poor Water Layering On Top Of Heavier, Colder, Saltier, Nutrient-rich Water.



- Usually, **Ocean Ecosystems, Currents, Wind, And Tides** Mix These Layers, Creating Smoothed Temperature And Salinity Transitions Between Them.
- But Because Of Climate Change, **Stratification Has Increased**, Making It Harder For Water Layers To Mix With Each Other, Which Has Severe Consequences - **Oceans Are Able To Absorb Less Carbon Dioxide From The Atmosphere And The Oxygen Absorbed Isn't Able To Mix Properly** With Cooler Ocean Waters Below, Threatening The Survival Of Marine Life.
- Moreover, **Nutrients Aren't Able To Travel Up To The Surface Of The Oceans From Below**. This Directly Impacts Phytoplankton, Which Thrives, As Mentioned Before, On The Upper Surface Of The Oceans.
- Changes In The **Composition Of The Plankton Population** Have Larger Effects On The Marine Ecosystem. Plankton Has Two Major Types: **Phytoplankton, Which Are Plants, And Zooplankton, Which Are Animals**.

- Phytoplankton Are Eaten By Zooplankton, Which Are Then Eaten By Other Marine Animals Such As Crabs, Fish And Sea Stars, And Therefore, Plankton Are Critical In Supporting Marine And Freshwater Food Webs. **Any Alteration In Their Population Could Throw Off The Whole Marine Ecosystem.**



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