First global atlas of marine plankton reveals remarkable underwater world

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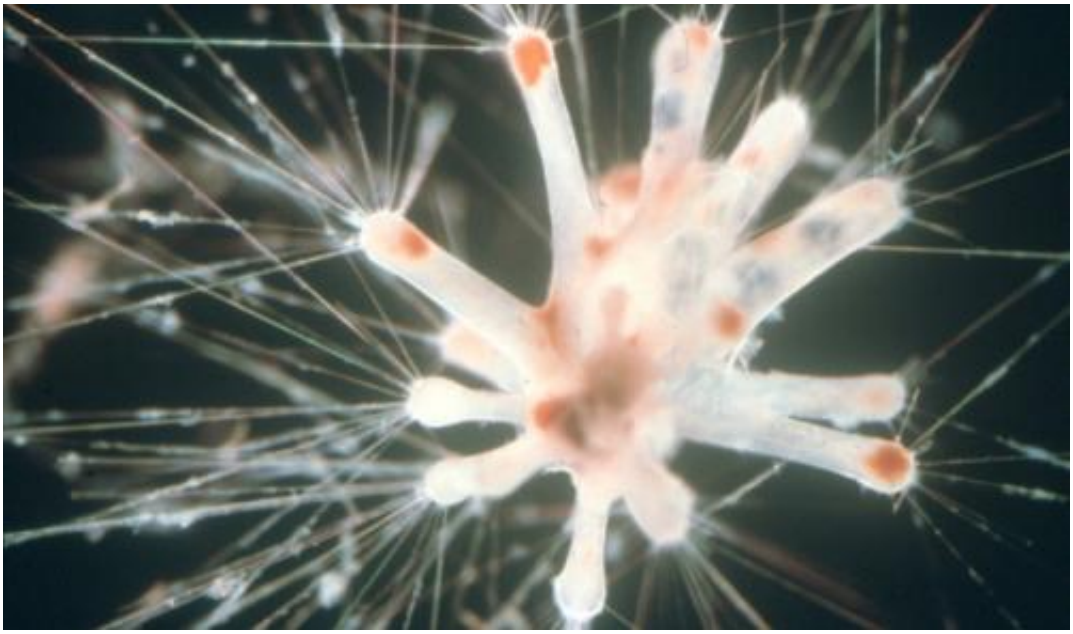

(Phys.org) —Under the microscope, they look like they could be from another planet. But near infinite numbers of microscopic organisms inhabit the depths of our oceans.

Now researchers from the University of East Anglia have helped to compile the first ever global atlas of marine plankton - published today in a special issue of the journal *Earth System Science Data*.

They are part of an international team who have identified where, when and how much oceanic plankton can be found around the globe – ranging in size from bacteria to jellyfish.

Oceans cover 70 per cent of the Earth's surface and are on average 4 km deep. But until now, little was known about the composition of this enormous ecosystem.

The atlas, known as MAREDAT, will help researchers better understand marine biodiversity for conservation and monitoring. The data will also have wide-ranging applications across ocean and climate science – such as helping scientists create computer models to predict the impact of climate change and ocean acidification.

Dr Erik Buitenhuis from UEA's school of Environmental Studies said: "The ocean ecosystem is completely dominated by small organisms. There are virtually no plants in the ocean and the base of the food chain is formed by algae that are between one thousandth and one fifth of a millimetre in size. They are far too small to see with the human eye, but they look amazing under the microscope.

Video credit: Planktonchronicles.org, www.planktonchronicles.org

"They're very important too. The marine ecosystem provides many services to humankind, including creating enough oxygen for every other breath we take.

"They also play an important role in the ocean's carbon cycle by removing carbon dioxide from the atmosphere during photosynthesis and storing it deep under the sea – isolated from the atmosphere for centuries. So this new data is extremely valuable to help us predict climate change and its associated consequences.

"As well as being vital to climate control, plankton is also the base of the food chain for fisheries so it is incredibly important for food security.

"One of the most interesting things that we found is that there is as much zooplankton (animals and otherheterotrophs) as phytoplankton (photosynthetic/plant-like organisms). This is really astonishing, given that on land the ratio between plant and animal biomass is around 500:1," he added.

The first edition of the MAREDAT global plankton atlas took three years to compile and combines information from half a million data points.

It is the result of a collaboration between scientists at UEA and ETH Zurich, along with the University of Manchester, Université d'Angers and CNRS, Woods Hole Oceanographic Institution, and the US National Oceanic and Atmospheric Administration.

"This was difficult work and only feasible in collaboration with a range of experts," said Meike Vogt from the Institute of Biogeochemistry and Pollutant Dynamics at ETH Zurich, who co-coordinated the project.

"The conversion of abundance data to biomass requires an understanding of the differences in cell and organism size, life stages, and volume to carbon ratios among different species of the same functional group, parameters that are poorly quantified for many plankton taxa."

The authors hope that the new MAREDAT atlas will serve as a starting place to expand the atlas and fill missing regions that are currently under-sampled, such as the South Pacific and parts of the Southern Ocean. It is the first step towards a comprehensive inventory of the marine biota based on counts of individual cells or organisms.

The MAREDAT global atlas is published as a special edition of the journal *Earth System Science Data* on July 19.

Provided by University of East Anglia