

New dataset provides 40-year record of carbon dioxide accumulation in the surface ocean

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The most comprehensive dataset of surface water carbon dioxide (CO₂) measurements for the world's oceans and coastal seas is launched today by an international team of scientists led by the University of East Anglia (UEA).

The Surface Ocean CO₂ [Atlas](#) (SOCAT) comprises 6.3 million global observations made from research vessels, commercial ships and moorings around the world since 1968. The [dataset](#) documents the changes in ocean carbon similar to the Mauna Loa record – or 'Keeling curve' - showing the rise in atmospheric CO₂ over time.

Further details will be published tomorrow in *Eos* - the journal of the American Geophysical Union. The entire dataset is freely available to scientists and members of the public via the SOCAT website: www.socat.info.

Net CO₂ absorption by the world's oceans is known to benefit human-kind by reducing the concentration of this greenhouse gas in the atmosphere, but the increase in ocean carbon also causes ocean acidification endangering marine organisms. Knowledge of year-to-year and decadal changes in oceanic CO₂ uptake are essential for assessing the feedbacks between climate change and the ocean carbon cycle.

This new dataset was assembled by a team of more than 100 scientific

experts from around the world, co-ordinated by scientists from: the Bjerknes Centre for Climate Research/University of Bergen/Uni Research, Norway; the University of East Anglia in the UK; the National Oceanic and Atmospheric Administration (NOAA), the University of Washington and the [Carbon Dioxide](#) Information Analysis Center in the US; and the Centre National de la Recherche Scientifique (CNRS) and the International Ocean Carbon Coordination Project (IOCCP) of the Intergovernmental Oceanographic Commission (IOC) of UNESCO in France.

Dr Dorothee Bakker, Dr Ute Schuster and Prof Andy Watson of UEA's School of Environmental Sciences believe the dataset will become a cornerstone of climate change research.

Dr Bakker said: "Assembling this dataset has been a major undertaking by sea-going marine carbon scientists from across the world for the last four years. We believe SOCAT will become an invaluable resource for anyone studying the ocean carbon cycle and its influence on global temperatures."

Dr Are Olsen, from the Bjerknes Centre for Climate Research, which physically assembled the dataset, said: "The unique aspect of this dataset is that the observations have been combined into a single uniform format and quality controlled. Reformatted input data and recalculated output data are publicly available at www.pangaea.de. The methods we have used are transparent and fully documented."

To make the dataset user-friendly, it is available on the web through a sophisticated online data visualisation and manipulation tool called the Live Access Server. The server provides interactive maps that enable users to interrogate the data. Gridded monthly data are also available.

Dr Christopher Sabine, of NOAA's Pacific Marine Environmental

Laboratory in Seattle, Washington, added: "Our objective from the beginning was to make these products freely available to everyone. We are excited to see how the data will be used by professional and amateur scientists alike."

Dr Nicholas Metzl, of the CNRS LOCEAN/IPSL laboratory in Paris, said: "Four years ago no global surface ocean CO₂ database was publicly available. SOCAT represents a fantastic new tool for ocean and climate scientists. Results derived from SOCAT will be used for the next IPCC report."

Dr Wendy Watson-Wright, assistant director general and executive secretary of IOC, welcomed the launch of this joint initiative: "The IOC of UNESCO is very pleased to have been able to participate in this project. For more than 50 years we have been promoting international co-operation in ocean science. This achievement is a reward for all our efforts."

The SOCAT project was initiated in 2007 by the IOC-SCOR IOCCP, the Surface [Ocean](#) Lower Atmosphere Study (SOLAS) and the Integrated Marine Biogeochemistry and Ecosystem Research project (IMBER). The project ensures long-term access to high quality, regularly updated [surface ocean](#) CO₂ data. Potential applications include carbon budgets, studies of seasonal, year-to-year and decadal variation in oceanic CO₂ uptake, and research into the processes driving these. Work on the next SOCAT update has already started.

More information: 'The Surface Ocean CO₂ Atlas (SOCAT): a new tool for assessing changes in the ocean carbon sink' by DCE Bakker et al. will be published on Saturday March 17 in *Eos*, the journal of the American Geophysical Union.

Provided by University of East Anglia

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