CenBASE ^{3}He and SF_6 data

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Project
» Dual gas tracer measurements during the Central Baltic Sea Air-Sea Exchange Experiment (CenBASE) (CenBASE)

Programs
» Ocean Carbon and Biogeochemistry (OCB)
» United States Surface Ocean Lower Atmosphere Study (U.S. SOLAS)

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Coverage

Spatial Extent: **Lat**:0 **Lon**:0

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Parameters

Parameters for this dataset have not yet been identified

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Project Information

Dual gas tracer measurements during the Central Baltic Sea Air-Sea Exchange Experiment (CenBASE) (CenBASE)

Coverage: Baltic Sea

NSF Abstract:

This award is funded in whole or in part under the American Rescue Plan Act of 2021 (Public Law 117-2).

The process that controls the exchange of gases between the atmosphere and the ocean plays an important role in regulating global climate, since it influences the amount of atmospheric greenhouse gases and aerosol precursors. Once in the atmosphere, these substances influence global and regional climate. Over the past 30 years, significant advances have been made in understanding this process in the open ocean away from the coasts, and how wind speed controls this process. These advances are mainly due to improvements in

experimental techniques, and a number of successful scientific experiments in the open ocean. However, it is not clear if the same understanding applies to inland seas like the Baltic Sea. There, the presence of surfactants, which are biological and chemical substances that concentrate at the sea surface, and the lower salinity, could influence how wind affects this process in a different way than in the open ocean. In this project, a team of investigators will conduct an experiment that aims to assess these processes in the Baltic and compare them to previous experiments in the open ocean.

The Central Baltic Sea Air-Sea Exchange Experiment (CenBASE) is a collaboration between scientists from the US, UK, and Germany to measure gas exchange rates in the central Baltic Sea on the German research vessel Elisabeth Mann Borgeseat. This proposal will provide funding to US scientists to make measurements of two gas tracers used to determine the gas exchange rate. German scientists are independently funded to measure surfactants, and make direct flux measurements of carbon dioxide and dimethyl sulfide, as well as make continuous measurements of pCO2, CH4, N2O, O2, and CO in the sea surface, and discrete measurements of dissolved inorganic carbon, total alkalinity, and pH in the water column. A UK colleague will make measurements of bubble size distribution. The ultimate goals of CenBASE are to determine whether the relationship between wind speed and gas exchange in the open ocean also applies to inland seas like the Baltic, shed new light on the effect of natural surfactants on gas exchange, and examine whether different techniques for measuring gas exchange are in agreement.

This award reflects NSF's statutory mission and has been deemed worthy of support through evaluation using the Foundation's intellectual merit and broader impacts review criteria.

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Program Information

Ocean Carbon and Biogeochemistry (OCB)

Website: http://us-ocb.org/

Coverage: Global

The Ocean Carbon and Biogeochemistry (OCB) program focuses on the ocean's role as a component of the global Earth system, bringing together research in geochemistry, ocean physics, and ecology that inform on and advance our understanding of ocean biogeochemistry. The overall program goals are to promote, plan, and coordinate collaborative, multidisciplinary research opportunities within the U.S. research community and with international partners. Important OCB-related activities currently include: the Ocean Carbon and Climate Change (OCCC) and the North American Carbon Program (NACP); U.S. contributions to IMBER, SOLAS, CARBOOCEAN; and numerous U.S. single-investigator and medium-size research projects funded by U.S. federal agencies including NASA, NOAA, and NSF.

The scientific mission of OCB is to study the evolving role of the ocean in the global carbon cycle, in the face of environmental variability and change through studies of marine biogeochemical cycles and associated ecosystems.

The overarching OCB science themes include improved understanding and prediction of: 1) oceanic uptake and release of atmospheric CO2 and other greenhouse gases and 2) environmental sensitivities of biogeochemical cycles, marine ecosystems, and interactions between the two.

The OCB Research Priorities (updated January 2012) include: ocean acidification; terrestrial/coastal carbon fluxes and exchanges; climate sensitivities of and change in ecosystem structure and associated impacts on biogeochemical cycles; mesopelagic ecological and biogeochemical interactions; benthic-pelagic feedbacks on biogeochemical cycles; ocean carbon uptake and storage; and expanding low-oxygen conditions in the coastal and open oceans.

United States Surface Ocean Lower Atmosphere Study (U.S. SOLAS)

Website: http://www.us-solas.org/

Coverage: Global

The Surface Ocean Lower Atmosphere Study (SOLAS) program is designed to enable researchers from different disciplines to interact and investigate the multitude of processes and interactions between the coupled ocean and atmosphere.

Oceanographers and atmospheric scientists are working together to improve understanding of the fate, transport, and feedbacks of climate relevant compounds, and also weather and hazards that are affected by processes at the surface ocean.

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Physical, chemical, and biological research near the ocean-atmosphere interface must be performed in synergy to extend our current knowledge to adequately understand and forecast changes on short and long time frames and over local and global spatial scales.

The findings obtained from SOLAS are used to improve knowledge at process scale that will lead to better quantification of fluxes of climate relevant compounds such as CO2, sulfur and nitrogen compounds, hydrocarbons and halocarbons, as well as dust, energy and momentum. This activity facilitates a fundamental understanding to assist the societal needs for climate change, environmental health, weather prediction, and national security.

The US SOLAS program is a component of the International SOLAS program where collaborations are forged with investigators around the world to examine SOLAS issues ubiquitous to the world's oceans and atmosphere.

Â» International SOLAS Web site

Science Implementation Strategy Reports

US-SOLAS (4 MB PDF file)
Other SOLAS reports are available for download from the US SOLAS Web site

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Funding

Funding Source	Award
NSF Division of Ocean Sciences (NSF OCE)	OCE-2123997

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