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Part 1: Sessions proposed by CLIVAR Scientists

## [AI001: Advances in understanding ocean eddies and their interactions with the atmosphere](https://agu.confex.com/agu/os18/preliminaryview.cgi/Session28123)

**Session ID#:**28123

**Session Description:**

The ocean, like the atmosphere, is a fundamentally turbulent system. As such, intense nonlinear interactions give rise to fine-scale structures, such as eddies, fronts, jets and filaments, that are of critical importance for the ocean circulation. These features are ubiquitous, and they have been recognized as key contributors to ocean transport of properties. Their energy generally exceeds that of the mean flow by an order of magnitude or more. Mounting evidence points to intense interactions, especially in the extratropics, between the atmosphere and the ocean on the scales of ocean eddies, which are much smaller than atmospheric synoptic scales. These interactions can have an important impact on the entire troposphere, affecting the positions of jet streams and their low-frequency variability, and they are likely a key-missing element in closing the budget of Earth’s energy imbalance. Theoretical understanding of eddy dynamics, especially in terms of air-sea interactions, however, remains incomplete. This represents an acute weakness in our present understanding of coupled ocean-atmosphere dynamics and its role in shaping variability and change of Earth’s climate.

We encourage submissions of abstracts describing new research findings, from observations and numerical modeling, on ocean mesoscale eddies, including their interactions with and feedbacks from the atmosphere.

**Primary Chair:  Sabrina Speich**, Ecole Normale Supérieure Paris, Paris, France

**Co-chairs:  Walter A Robinson**, North Carolina State University Raleigh, Raleigh, NC, United States, **Enrique Curchitser**, Rudgers University, Rutgers Dept. of Environmental Sciences, New Brunswick, United States and **Xiaopei Lin**, Ocean University of China, Qingdao, China

## [EP005. Closing the gap between wind stress and ecosystem productivity in eastern boundary upwelling regions](https://agu.confex.com/agu/os18/preliminaryview.cgi/Session28650)

**Session ID#:**28650

##### Session Description:

Eastern boundary upwelling ecosystems contain the most productive fisheries in the world.  This immense fish production results from upwelled nutrients that stimulate high primary and secondary production.  However, the relationships between atmospheric forcing and the ecological productivity of these ecosystems are not straightforward.  Variability in nutrient stoichiometry, oxygen concentrations, nutricline depth, seasonal timing of upwelling, mesoscale and submesoscale variability, onshore geostrophic flow, and subduction of underutilized nutrients below the adjacent oligotrophic water masses are all examples of processes that can obscure the relationships between the intensity of upwelling-favorable wind stress and ecosystem productivity.  In this session, we welcome contributions that investigate processes that may be crucial for resolving the relationships between atmospheric forcing and primary and secondary production.  The objective of the session is to improve the community’s understanding of the processes and resolutions required (in both models and observations) to accurately describe the impacts of physical and biogeochemical drivers on fish and other higher-trophic-level populations of interest.  Such understanding will allow better interpretation of non-stationary empirical relationships between physical conditions and ecosystem state, and is necessary to properly project and interpret ecological impacts of climate variability and change.

**Primary Chair:  Ryan R Rykaczewski**, University of South Carolina Columbia, Columbia, SC, United States

**Co-chairs:  Steven James Bograd**, NOAA Pacific Grove, Pacific Grove, CA, United States, **Michael Jacox**, University of California-Santa Cruz, San Francisco, CA, United States and **Bryan Black**, University of Texas at Austin, Austin, TX, United States

## [OD003: Data rescue and synthesis for climate and environmental science](https://agu.confex.com/agu/os18/preliminaryview.cgi/Session29822)

**Session ID#:**29822

##### Session Description:

The purpose of this session is to discuss how researchers synthesize long-term environmental data from repositories and archives to develop new products. Mining large volumes of long-term observations is required to establish reference baselines against which the state of the environment can be assessed and offer new revelations and approaches to our current scientific understanding. Integrative data analyses that incorporate multidisciplinary and “Big Data” approaches are a powerful way to obtain insights beyond the data’s original collection purpose. A central use case involves the long-term subsurface ocean temperature and salinity observational datasets that are essential to the understanding of variability and change in the Earth's energy and water cycle, to discriminate between natural and anthropogenic drivers, and to predict future changes. Millions of ocean subsurface observations have been collected by different investigators and institutions, with a variety of quality standards. An important aspect of putting our current environment in perspective is identifying and restoring to general use these historic observations in order to extend our understanding environmental change as far back in time as possible. Data rescue is not only creating and improving access to historical data but also assuring the quality of those data. We invite scientists, resource management practitioners, and policy makers to discuss ways they are currently leveraging environmental data holdings and any issues or recommendations they have for improvements of how data are put in or accessed from large national and international databases. This session invites abstracts related to the discovery and availability of environmental data and metadata as well as improving the utility of these data though the use of various quality control techniques. The focus of the session will be on describing these diverse efforts, lessons learned, and best practices to improve integration of diverse data holdings that can then spur research that addresses innovative science and provides decision makers with actionable information.

**Primary Chair:  Carrie Wall**, CIRES, Boulder, CO, United States; National Centers for Environmental Information, NOAA, Boulder, CO, United States

**Co-chairs:  Catia M Domingues**, University of Tasmania, Hobart, Australia, **Krisa M Arzayus**, NOAA National Centers for Environmental Information, NCEI, Silver Spring, MD, United States and **Matthew D Palmer**, UK National Oceanography Centr, Liverpool, United Kingdom

## [PC002: Causes of Contemporary Sea Level Variability and Change from Global to Coastal Scales](https://agu.confex.com/agu/os18/preliminaryview.cgi/Session27675)

**Session ID#:**27675

**Session Description:**

Quantitative understanding of the causes of sea level variability and change is important for the development of improved sea level projections and forecasts and assessment of related coastal impacts. This session seeks modeling and data analyses that address causes of sea level variability and change on timescales of months to centuries, at the local, regional and global levels. Of particular interest are studies that advance understanding of the connections between the large-scale ocean circulation and coastal sea level, including how climate modes of variability project onto the coastal zone. Other topics of interest include the mass and steric contributions to sea level budgets and their underlying forcing mechanisms and dynamics involving air-sea-ice interactions, and the attribution of regional sea level change to natural and anthropogenic causes.

**Primary Chair:  Rui M Ponte**, Atmospheric and Environmental Research, Lexington, MA, United States

**Co-chairs:  Benoit Meyssignac**, Observatory Midi-Pyrenees, Toulouse, France, **Catia M Domingues**, University of Tasmania, Hobart, Australia and **Detlef Stammer**, University of Hamburg, Hamburg, Germany

## [PC005. Meridional Overturning Circulation dynamics in past warm and cold climates](https://agu.confex.com/agu/os18/preliminaryview.cgi/Session29792)

**Session ID#:**29792

##### Session Description:

The meridional overturning circulation (MOC) is a key component of the global climate system, as it modulates the transport and storage of both heat and carbon. Changes in deep-ocean circulation are thought to have played a key role in past climatic transitions, such as between glacial and interglacial periods. However, reaching a quantitative understanding of the dynamics that contributed to these changes, remains a major challenge in climate research. The MOC’s response to current climate trends is also an unknown when assessing future global ocean-climate-carbon cycle interactions. Investigating how the MOC varied in the past can provide crucial information on the mechanisms and drivers of its variability, as well as on the possible impacts of future circulation changes. This multidisciplinary session will facilitate discussions between the modeling and data communities, with the aim to explore both the transient and equilibrium response of the MOC to different forcing scenarios. We welcome contributions from both proxy-based studies to reconstruct past changes, and those exploring these dynamics from a mechanistic perspective, spanning from theoretical approaches to fully-coupled numerical modeling efforts. We especially encourage combined model-data analyses, as well as studies investigating past periods that could be viewed as analogues for future climates.

**Primary Chair:  Alice Marzocchi**, University of Chicago, Geophysical Sciences, Chicago, IL, United States

**Co-chairs:  Benoit Thibodeau**, The University of Hong Kong, Earth Sciences and SWIMS, Hong Kong, Hong Kong, **Juan Muglia**, Oregon State University, College of Earth, Ocean, and Atmospheric Sciences, Corvallis, OR, United States and **Andrea Burke**, University of St Andrews, St Andrews, KY16, United Kingdom

## [PC012. Tracking ocean heat content and its role in Earth’s climate variability and change](https://agu.confex.com/agu/os18/preliminaryview.cgi/Session28436)

**Session ID#:**28436

##### Session Description:

The ocean’s capacity to store heat and to redistribute it geographically and over depth is fundamental to understanding Earth’s climate and sea level variability and change. More than 90% of the Earth's energy imbalance and about one-third of observed global mean sea level rise are explained by ocean heat uptake. This session aims to bring together studies tracking ocean heat content and thermosteric sea level and its implications for climate and sea level variability and change, from global to regional scales. We welcome studies based on in situ and satellite observing systems, ocean or coupled reanalyses, and climate modelling as well as process studies. Studies focusing on the ocean’s role in the Earth energy imbalance, climate sensitivity and regional changes associated to natural climate modes of variability are also solicited.

**Primary Chair:  Karina von Schuckmann**, Mercator Océan, Ramonville-Saint-Agne, France; Mercator Ocean, Ramonville-Saint-Agne, France

**Co-chairs:  Tim Boyer**, National Oceanographic Data Center, Silver Spring, MD, United States, **Cheng Lijing**, Institute of Atmospheric Physics, International Center for Climate and Environment Sciences, Beijing, China and **Andrea Storto**, CMCC, Bologna, Italy

## [PL001. Advances in our understanding of the meridional overturning circulation in the South Atlantic](https://agu.confex.com/agu/os18/preliminaryview.cgi/Session27827)

**Session ID#:**27827

##### Session Description:

The meridional overturning circulation (MOC) is a key component of the climate system because of its role in redistributing heat, salt and carbon around the globe.  The tremendous growth of the MOC observing system over the past ~15 years has led to new discoveries about the spatial and temporal variability of the MOC and how it influences coastal sea level, weather, and climate. Models and observations have shown that the water masses formed in remote regions are significantly altered as they transit the South Atlantic by processes such as mixing, advection, and local air-sea interactions.  These modifications may lead to changes of the MOC strength and variability, and thus of the meridional heat and freshwater transport changes.  In this session, we focus on recent results gleaned from observing systems in the South Atlantic, including moored, satellite, shipboard, and Lagrangian measurements. Recent model results on the MOC in the region, are also welcome.  Together these observations and modeling results can provide a comprehensive view on South Atlantic MOC (SAMOC) variability. We encourage abstract submissions on new MOC-related findings in the South Atlantic, as well as on recommendation and/or design studies for the future evolution of the SAMOC observing system.

**Primary Chair:  Renellys C Perez**, UM/CIMAS, Miami, FL, United States

**Co-chairs:  Maria Paz Chidichimo**, Argentine Scientific and Technological Research Council; Hydrographic Service; Universidad de Buenos Aires, Buenos Aires, Argentina, **Rebecca Marie Hummels**, GEOMAR Helmholtz Centre for Ocean Research Kiel, Kiel, Germany and **Tarron Lamont**, Department of Environmental Affairs, South Africa

## [PL002. Atlantic Meridional Overturning Circulation: Modeling and Observations](https://agu.confex.com/agu/os18/preliminaryview.cgi/Session27800)

**Session ID#:**27800

##### Session Description:

Through its associated heat, salt, and carbon transports, the Atlantic Meridional Overturning Circulation (AMOC) significantly influences the climate of the North Atlantic and surrounding areas and can even impact global climate through interactions with atmosphere on seasonal to multi-decadal timescales. Because the memory of the ocean vastly exceeds that of the atmosphere, AMOC is thought to represent the dynamical memory of the climate system, playing a major role in climate variations, hence in climate predictions, on these and even longer, i.e., centennial to millennial, timescales. Support for such a prominent role for AMOC on long time scales comes from coupled general circulation model simulations and proxy records. On shorter, i.e., intra-seasonal to decadal, timescales, measurements of transports, heat content, and other variables throughout the Atlantic Ocean have been instrumental in investigating the spatial structure, mechanisms, and impacts of AMOC variability, showing the importance of processes from the mesoscale to the basin scale. A synergy of knowledge gained from all these efforts will lead to a better understanding of AMOC.

We invite contributions from modeling and observational (both instrumental and proxy) studies, investigating AMOC variability and mechanisms as well as its role in climate predictions on various, e.g., decadal, timescales.

**Primary Chair:  Gokhan Danabasoglu**, National Center for Atmospheric Research, Boulder, CO, United States

**Co-chairs:  Femke de Jong**, WHOI, Woods Hole, MA, United States, **Rong Zhang**, NOAA Geophysical Fluid Dynamics Laboratory and **Meric A Srokosz**, National Oceanography Center, Soton, Southampton, United Kingdom

## [PL003. Biophysical dynamics of boundary upwelling systems in a changing ocean: Synthesis of current knowledge and future observational and modeling approaches](https://agu.confex.com/agu/os18/preliminaryview.cgi/Session27990)

**Session ID#:**27990

##### Session Description:

Boundary upwelling ecosystems (BUE) are known to play a significant role for ocean productivity and regulation of regional climate variability. The strong coupling between atmospheric forcing, ocean circulation, biogeochemical cycling, and fisheries have long motivated multidisciplinary studies that are now common in BUE. These ecosystems are increasingly vulnerable to the multiple effects caused by climate change, ocean acidification, deoxygenation, harvest of marine resources and coastal development.  In order to manage and predict these valuable ecosystems, new and evolving scientific approaches to the collection of information and modeling are required. In this session, we seek papers synthesizing current knowledge as well as advances in the development of new observational tools and modeling approaches for understanding the multi-faceted dynamics of BUE.

**Primary Chair:  Enrique N Curchitser**, Rutgers University New Brunswick, Department of Environmental Sciences, New Brunswick, NJ, United States

**Co-chairs:  Raleigh Hood**, University of Maryland and **Ruben Escribano**, Universidad de Concepcion, Chile

## [PL006. Multi-scale Variability of Western Boundary Currents and their Role in Climate and Ecosystems](https://agu.confex.com/agu/os18/preliminaryview.cgi/Session29753)

**Session ID#:**29753

##### Session Description:

The global oceanic basins feature energetic boundary currents (BCs) that redistribute water, heat and salt, and exhibit a complex web of physical and biogeochemical processes along their paths.  As such, BCs play a major role in regulating the global climate system. Yet monitoring the multi-space and time scales of the energetic dynamic flows of boundary currents can be complicated. These boundary currents tend to act as barriers to cross-front flow, but variability associated with multiple types of instabilities, and on a range of time and space scales, act to facilitate cross-front flow, stirring, and mixing along their paths, further complicating the study of these currents.  This session seeks contributions from studies including, but not limited to, the full multi-scale variability of BCs from time and space scales that span subseasonal to multi-decadal and from turbulent to basin scales; their interaction with marginal seas, frontal processes and air-sea interaction; and their impacts on marine ecosystems.  In addition, we welcome papers that discuss observational (in situ and remote), analysis, theoretical and model simulations that emphasize achievements in sustained BC monitoring, and so provide guidance for the  development of a future effective and efficient monitoring network.

**Primary Chair:  Zhaohui Chen**, Ocean University of China, Qingdao, China

**Co-chairs:  Janet Sprintall**, University of California San Diego, La Jolla, CA, United States, **Emma E Heslop**, SOCIB, Palma, Spain and **Stuart P Bishop**, North Carolina State University, Marine, Earth, and Atmospheric Sciences, Raleigh, NC, United States

# Part 2: Sessions related to CLIVAR Science

# Air-Sea Interactions

## [AI002. Air-Sea Exchange Processes in Western Boundary Current Systems and Marginal Seas: Their Local and Remote Climatic Implications](https://agu.confex.com/agu/os18/preliminaryview.cgi/Session28635)

**Session ID#:**28635

##### Session Description:

This session focuses on intense surface fluxes of heat, moisture and momentum within western boundary current systems and adjacent marginal seas, known as climatic “hot spots”. These hot spots influence the mean state of Earth’s climate and hydrological cycles both locally and globally through coupled ocean-atmospheric interactions at a variety of spatio-temporal scales.

This session seeks contributions characterizing variability in the air-sea exchanges themselves or their influence on atmospheric and oceanic variability.

Presentations are invited based on diagnostic, modeling and theoretical studies on a range of topics including, but not limited to:

1) High-resolution model inter-comparison projects, either coupled or uncoupled.

2) Processes affecting variations in surface fluxes around oceanic fronts, jets, or mesoscale eddies, and their local and remote influences on temperature, wind, and precipitation distributions.

3) Organization of cloud and precipitation systems.

4) Extratropical cyclone development, variability in mid-latitude storm tracks, jet streams, and precipitation distribution, and their feedbacks and influences on ocean temperature, salinity, currents, and mode water formation.

5) Observational (both in situ and remote sensing) analyses which characterize these processes and evaluate their representations in atmosphere/ocean models and reanalyses.

**Primary Chair:  Larry W O'Neill**, Oregon State University, Corvallis, OR, United States

**Co-chairs:  Hisashi Nakamura**, University of Tokyo, Bunkyo-ku, Japan, **James F Booth**, CUNY City College of New York, Earth and Atmospheric Science, New York, NY, United States and **Angeline G Pendergrass**, National Center for Atmospheric Research, Boulder, CO, United States

## [AI003. Air-Sea Interaction at the Mesoscale and Submesoscale](https://agu.confex.com/agu/os18/preliminaryview.cgi/Session22626)

**Session ID#:**22626

##### Session Description:

Air-sea interaction has important coupled effects on the properties of the oceanic and atmospheric boundary layers, and the flux of momentum, heat, and other tracers between the atmosphere and ocean. For example, sea-surface temperature gradients at ocean fronts and eddies modify the surface wind field through changes in atmospheric boundary layer turbulence and pressure gradients. These changes in turn affect the evolution of the ocean boundary layer. Much of our understanding of these processes has been developed in considering the ocean mesoscale (horizontal scales of O(10-100 km)). However, recent advances in high-resolution numerical modeling, and future improvements in remote sensing, allow for consideration of ocean-atmosphere interaction at increasingly fine-scales, including the ocean submesoscale (O(100 m - 10 km)). Whether the mechanisms of mesoscale ocean-atmosphere interaction apply at the submesoscale, or whether other processes dominate, is an important open question. In this session we welcome contributions related to understanding air-sea interaction at the mesoscale and submesoscale, and how the mechanisms, and impacts, may depend on spatial scale. Contributions utilizing theory, observations, and numerical models are welcomed, as well as work focused on the impacts of coupled air-sea interaction on the physical or biogeochemical properties of the ocean or atmospheric boundary layers.

**Primary Chair:  Jacob O Wenegrat**, Stanford University, Stanford, CA, United States

**Co-chairs:  Larry W O'Neill**1, **Simon P de Szoeke**1 and **Hyodae Seo**2, (1)Oregon State University, Corvallis, OR, United States(2)Woods Hole Oceanographic Institution, Woods Hole, MA, United States

## [AI008. Ocean salinity and its role in ocean dynamics and the water cycle](https://agu.confex.com/agu/os18/preliminaryview.cgi/Session29646)

**Session ID#:**29646

##### Session Description:

This session highlights research investigating ocean salinity as a key parameter that links various elements of the water cycle to ocean circulation dynamics and climate. Contributions are invited on all aspects of ocean salinity investigations, including analyses undertaken from in situ and satellite observations, numerical models, and data assimilation. We particularly welcome contributions that have utilized sea-surface salinity (SSS) measurements from the recent pathfinder satellite missions (SMOS, Aquarius/SAC-D, and SMAP), as well as observations collected during the SPURS (Salinity Processes Upper-ocean Regional Study) experiment and other field campaigns. The session will focus on: recent progress from salinity remote sensing; new process-based insights from field observations; salinity-driven thermohaline circulation, upper-ocean stratification, and related ocean dynamics; links between salinity and global and regional climate variability; the water cycle, as well as the fingerprint of long-term change; salinity assimilation into ocean models; and the scientific imperative for future salinity measurement continuity and enhancement.

**Primary Chair:  Paul James Durack**, Lawrence Livermore National Laboratory, Livermore, CA, United States

**Co-chairs:  Eric J Bayler**, NOAA/NESDIS/STAR, College Park, MD, United States, **Jacqueline Boutin**, LOCEAN, Paris Cedex 05, France and **Severine Fournier**, JPL/NASA/Caltech, Pasadena, CA, United States

## [AI009. Role of oceans in tropical/extratropical air-sea interactions](https://agu.confex.com/agu/os18/preliminaryview.cgi/Session28128)

**Session ID#:**28128

##### Session Description:

Oceans play an important role in setting the variations of climate in tropical and extratropical regions. The Air-sea interactions in the tropics, such as El Nino-Southern Oscillation (ENSO), Indian Ocean Dipole (IOD) and Atlantic Nino, influence the weather and climate not only in the tropics but also in the mid- and high latitudes through teleconnections. However, these tropical-extratropical interactions are not always captured by global climate models. In fact, this is one of the major reasons for model biases leading to low-level of predictability in seasonal to interannual climate variations of extra-tropics. In addition, air-sea interactions, in the mid- and high-latitude regions, including the interactions with sea-ice, remain a topic of active research. Those are especially active in oceanic fronts and meso-scale eddies and are not well represented in global models. This session seeks to bring together observational and modeling studies that investigate air-sea interaction, global teleconnections, ocean data assimilation and their impacts on climate predictions.

**Primary Chair:  Swadhin K Behera**, JAMSTEC Japan Agency for Marine-Earth Science and Technology, Kanagawa, Japan

**Co-Chair:  Masami Nonaka**, JAMSTEC Japan Agency for Marine-Earth Science and Technology, Kanagawa, Japan

## [AI010. Southern Ocean air-sea exchange and mixed-layer processes](https://agu.confex.com/agu/os18/preliminaryview.cgi/Session29747)

**Session ID#:**29747

##### Session Description:

The Southern Ocean exchanges freshwater, momentum, heat, carbon and other biogeochemical species between the high-latitude ocean and atmosphere. These air-sea fluxes play important roles in the Earth’s climate system. Many observational and modeling efforts seek to quantify these fluxes and their dependencies. Uncertainties in Southern Ocean air-sea exchange remain high and limit our ability to validate climate models. Circumpolar transport, exchange along the continental margins, and meso-scale variability modify mixed-layer budgets, air-sea fluxes, and freshwater transport. Antarctic scientific stations facilitate long oceanic time series while autonomous platforms increase the geographic density of in situ observations. Models and satellite observations extend and connect observations to reveal underlying dynamics. Developments in observing approaches, data interpretation and numerical simulations offer new possibilities for advancing understanding in ways not previously possible.

This session invites contributions that address surface flux estimates and mixed-layer processes in the Southern Ocean. Contributions addressing observing challenges, defining flux requirements, and/or presenting methodologies are welcome. We seek to bring together observers, modelers, and theorists.

**Primary Chair:  Martin S Hoecker-Martinez**, University of Michigan Ann Arbor, Climate and Space Sciences, Ann Arbor, MI, United States; University of Redlands, Physics, Redlands, CA, United States

**Co-chairs:  Sarah T Gille**, UCSD, La Jolla, CA, United States, **Daniel B Whitt**, National Center for Atmospheric Research, Climate and Global Dynamics Laboratory, Boulder, CO, United States and **Sebastiaan Swart**, University of Gothenburg, Department of Marine Sciences, Gothenburg, Sweden

## [AI011. Surface Currents in a Coupled Air/Sea System: Physics and Applications](https://agu.confex.com/agu/os18/preliminaryview.cgi/Session28727)

**Session ID#:**28727

##### Session Description:

Currents at the very surface of the ocean transport buoyant biological material including eggs and Sargassum, debris and contaminants such as oil, and fundamentally impact fluxes of momentum, heat and moisture across the air-sea interface. Though few observations have been made of currents at the very surface (within the upper few centimeters) of the ocean, it is understood that substantial shear can exist between the surface and depths of one to several meters deep, where most of the observations approximating the surface current are taken (e.g., from drifters with drogues, upward-looking ADCPs, or coastal radar). Not only is the velocity structure of the upper few meters poorly observed and its dynamics not fully described, but it is also unresolved in ocean models. As a consequence, for many applications involving numerical calculations of surface transport of biological materials and oil, crude parameterizations are often used to adjust ocean model currents to account for the unresolved vertical shear due to wind and waves. This multidisciplinary session invites contributions on the measurement and physics of surface currents and applications to biological and contaminant transport and air-sea fluxes modified by currents.

**Primary Chair:  Mark A Bourassa**, Florida State University, Tallahassee, FL, United States

**Co-chairs:  Thomas Kilpatrick**, UCSD, San Diego, CA, United States, **J. Thomas Farrar**, Woods Hole Oceanographic Institution, Woods Hole, MA, United States and **Ernesto Rodriguez**, JPL/NASA/Caltech, Pasadena, CA, United States

## [AI012. The influence of El Niño Southern Oscillation on biogeochemical cycling in eastern boundary upwelling system oxygen minimum zones and air-sea exchange in the overlying waters](https://agu.confex.com/agu/os18/preliminaryview.cgi/Session27615)

**Session ID#:**27615

##### Session Description:

Elevated surface productivity and subsequent subsurface remineralization typically result in eastern boundary upwelling systems (EBUS) being characterized by well-defined oxygen minimum zones (OMZs). As a principal determinant of redox state, oxygen availability plays an important role in regulating biogeochemical cycles. To this end, large perturbations to nutrient and climate active gas cycling are often observed in EBUS OMZs when compared to the oxygenated ocean, and the upwelling conditions in these regions can rapidly transport atmospherically relevant gases to the surface waters, creating sea-to-air gas flux hotspots. Depressed upwelling and deeper and less pronounced OMZs caused by El Niño conditions, can, however, cause periodic variability to the conditions that are typically observed in EBUS OMZs, as recently demonstrated by the ASTRA-OMZ cruise to the eastern tropical South Pacific OMZ in October 2015. To fully understand the role of EBUS OMZs for oceanic and atmospheric nutrient and dissolved gas budgets, it is important to consider these kinds of climatic variability. We welcome all submissions related to furthering our understanding of biogeochemical processes in EBUS OMZs and air-sea gas exchange in the overlying waters, but particularly encourage those which consider the impacts of periodic climate variability caused by El Niño events.

**Primary Chair:  Christa A Marandino**, GEOMAR Helmholtz Centre for Ocean Research Kiel, Kiel, Germany

**Co-chairs:  Damian Grundle**, Bermuda Institute for Ocean Science, Bermuda and **Tobias Steinhoff**, GEOMAR Helmholtz Centre for Ocean Research Kiel, Kiel, Germany

## [AI013. Tropical Cyclone-Ocean Interactions: From Weather to Climate](https://agu.confex.com/agu/os18/preliminaryview.cgi/Session22255)

**Session ID#:**22255

##### Session Description:

Tropical cyclone (TC)-ocean interactions are critical for TC intensity changes because the ocean is the energy source for TCs. Air-sea interaction processes involve energy and momentum exchange between TCs and the ocean and are important on TC (i.e., short-term) and climate (i.e., long-term) timescales. On shorter timescales, TC-ocean interactions are critical for intensity forecasting. The intense winds of TCs also significantly impact the ocean through entrainment mixing and upwelling. On climate timescales, the evolving state of the ocean has strong implications for future TC activity projections and consequential societal impact. In particular, natural interannual (e.g., ENSO) and inter-decadal variability (e.g., the Pacific Decadal Oscillation and Atlantic Multidecadal Oscillation) and global warming affect the ocean, TCs, and their interactions. This session welcomes submissions under the broad discipline of TC-ocean physical and biogeochemical interactions from weather to climate timescales. It intends to provide a friendly platform for interactions among oceanographers, atmospheric scientists, and climatologists in this multi-disciplinary field.

**Primary Chair:  Gregory R Foltz**, NOAA Miami, Miami, FL, United States

**Co-chairs:  Karthik Balaguru**, PNNL, Marine Sciences Laboratory, Seattle, WA, United States and **I-I Lin**, National Taiwan University, Taipei, Taiwan

## [AI014. Turbulent Air-Sea Fluxes: Observations and Modeling](https://agu.confex.com/agu/os18/preliminaryview.cgi/Session29653)

**Session ID#:**29653

##### Session Description:

The physical coupling between atmosphere and ocean helps to drive a myriad of processes, such as surface material transport, air-sea gas flux, and wind-wave interactions. Fundamentally, the interfacial fluxes of energy and mass occur at the molecules-wide boundary between air and water. Outside of nominal open ocean conditions, the fine-scale nature of these dynamics poses a significant empirical challenge and numerically representing the air-sea coupling is not trivial. It is therefore necessary to come to a mechanistic understanding of the processes affecting exchange of mass and energy across the air-sea interface, and advances in both observational and numerical methods are needed. This session invites contributions to better consolidate the role of the ocean-atmosphere coupled system and is focused on expanding the current understanding of the mechanisms driving air-sea fluxes. Submissions on near-surface processes that can modulate the interfacial exchange are encouraged. Presentations of novel techniques, methods, and/or venues for air-sea interaction study are highly encouraged. The Chairs hope that this session facilitates a focused discussion on the physics of air-sea interaction, with input from an array of technical backgrounds and perspectives.

**Primary Chair:  David Ortiz-Suslow**, University of Miami - RSMAS, Department of Ocean Sciences, Miami, FL, United States

**Co-chairs:  Brian Ward**, National University of Ireland, Galway (NUIG), School of Physics, Galway, Ireland and **Kai H Christensen**, Norwegian Meteorological Institute, Oslo, Norway

# Ecology and Physical Interactions

## [EP003. Basin to global scale ocean transport, connectivity, and dispersal: interdisciplinary connections](https://agu.confex.com/agu/os18/preliminaryview.cgi/Session28707)

**Session ID#:**28707

##### Session Description:

Physical transport of water masses over basin to global scales exerts control on processes as varied as global overturning circulation to the dispersal and ecological connectivity of endangered species. Use of observational floats, drifters, and tagging, combined with Lagrangian numerical studies, have provided new insights in both physical and biological applications. We solicit abstracts exploring pathways of ocean currents and organisms within them to facilitate cross-disciplinary exchange. For example: transport drives production of deep and intermediate water masses, upwelling drives ventilation and nutrient delivery, dispersal is an important life history strategy for species spanning microbial organisms to top predators, physical transport and mixing can interact with organism behavior to exert a strong control on dispersal, demographic and genetic connectivity, seascape boundaries and biological patchiness. However, much uncertainty remains:  in the pathways of water masses important to global ocean dynamics, in the details of the biological interactions with these currents, natural variability and climate change effects on these processes, with implications for biogeography and resilience of marine populations. Here we welcome modeling and observational studies of water transport, connectivity, and biological dispersal at the basin to global scale, as well as studies defining new metrics and providing theoretical insights.

**Primary Chair:  Cheryl S Harrison**, National Center for Atmospheric Research, Boulder, CO, United States

**Co-chairs:  James R. Watson**, Stockholm University, Stockholm Resilience Centre, Stockholm, Sweden, **Elliott L. Hazen**, NOAA Southwest Fisheries Science Center, Environmental Research Division, Monterey, CA, United States and **Vincent Rossi**, IFISC Institute for Cross-Disciplinary Physics and Complex Systems, Palma de Mallorca, Spain

## [EP009. Open ocean biological-physical interactions in the Eastern North Pacific from low to mid latitudes through in situ observations, satellite data and models](https://agu.confex.com/agu/os18/preliminaryview.cgi/Session28686)

**Session ID#:**28686

##### Session Description:

The Eastern North Pacific is an area where biological systems are impacted by a variety of physical processes at spatial scales ranging from sub-mesoscale through basin-scale. At low latitudes, the East Pacific includes the high nutrient low chlorophyll region of the cold tongue where mechanisms linked to shifts in biological production range from short-term turbulent mixing to periodic oscillations (e.g. ENSO). Meanwhile, the North Pacific Subtropical Gyre (NPSG) is somewhat of an enigma as an oligotrophic region with low nutrient levels that nonetheless supports dramatic summer phytoplankton blooms as well as the White Shark Cafe, where otherwise coastal great white sharks tend to congregate in winter and spring for reasons not yet understood. The recent advances in systems that observe biological variables (e.g. Bio-Argo floats) combined with two decades of global measurements from ocean color satellites and in-situ measurements, such as from the Hawaii Ocean Time-series (HOTS) program, provide an opportunity to explore this subject with more assets than ever before. This session will explore links between physical signals and biological variability in the Eastern North Pacific from low to mid latitudes with implications for long-term changes and regime shifts in biology.

**Primary Chair:  Stephanie Schollaert Uz**, NASA Goddard Space Flight Center, Greenbelt, MD, United States

**Co-Chair:  Cara Wilson**, NOAA/NMFS Southwest Fisheries Science Center, Monterey, CA, United States

## [EP011. Physical-biogeochemical interactions across scales: from microscale to mesoscale](https://agu.confex.com/agu/os18/preliminaryview.cgi/Session27994)

**Session ID#:**27994

##### Session Description:

Observations reveal spatio-temporal variations in marine and coastal biogeochemistry and ecosystems on scales ranging from the microscale to the mesoscale. Models suggest that processes at these small scales integrate to impact the larger scales. Recent developments in airborne, underway, and autonomous technologies allow for adaptive sampling (e.g. guided by glider swarms and drones). Increased computational power further provides new views onto a wider range of ecological and biogeochemical dynamics over a wider range of time and space scales than ever before. Questions that may be relevant to this session include: How do biophysical drivers of ecosystem structure scale up spatially - through trophic levels, or across biological scales of organization? What are the limits of predictability at different scales? How are recent engineering and computational innovations facilitating advances in the science? By bringing together observational and modeling efforts, we aim to develop a more complete perspective of the cross-scale physical-biogeochemical interactions in coastal and marine systems and new ideas about how to integrate these dynamics into predictive models.

**Primary Chair:  Daniel B Whitt**, National Center for Atmospheric Research, Climate and Global Dynamics Laboratory, Boulder, CO, United States

**Co-chairs:  Soeren Thomsen**, GEOMAR Helmholtz Centre for Ocean Research Kiel, Kiel, Germany, **Jessica Luo**, National Center for Atmospheric Research and **Liam Brannigan**, Stockholm University, MISU

## [EP012. Topographic Influences on Oceanographic Processes, Marine Communities, and Ecology](https://agu.confex.com/agu/os18/preliminaryview.cgi/Session27897)

**Session ID#:**27897

##### Session Description:

Abrupt topographies such as seamounts, pinnacles, trenches, and submarine canyons can have dramatic impacts on local oceanography and therefore on marine communities. The biological communities living at, on, and around these features likely experience different hydrodynamic (enhanced current velocities, turbulence, and shear), geological (enhanced substrate and slope heterogeneity), and biological (enhanced POC flux, food, and nutrient availability) forcings relative to proximate habitats. Large gaps still exist in our knowledge of the true nature of the impacts of abrupt topographies on physical and biological oceanographic processes. How local ecology, abundance, and diversity are influenced as a result continues to be an area of active research and discovery with important implications for understanding habitat use, benthic and pelagic community dynamics, conservation, and fisheries management, and this will be the main focus for the session.

**Primary Chair:  Astrid Brigitta Leitner**, University of Hawaii, Manoa, Oceanography, Honolulu, HI, United States

**Co-Chair:  Malcolm R Clark**, National Institute of Water and Atmospheric Research, Deepwater Fisheries Group, Wellington, New Zealand

# High Latitude Environments

## [HE002. Carbon cycling in Arctic Ocean and adjacent marginal seas under a changing climate](https://agu.confex.com/agu/os18/preliminaryview.cgi/Session29662)

**Session ID#:**29662

##### Session Description:

The Arctic Ocean and adjacent Arctic and Subarctic marginal seas disproportionately affect and are affected by climate change, rising atmospheric CO2, and the evolving ocean carbon cycle, the result of dramatic changes in sea-ice cover, high CO2 solubility in colder and fresher waters, and dynamic biological activity influenced by changing circulation and transfers of nutrients and carbon between interior water masses and terrestrial reservoirs. Contributions are solicited examining carbon cycling within the Arctic Ocean and adjacent Arctic and subarctic marginal seas, and carbon-transfers between these waters and the atmosphere, seafloor, adjacent continents, and bordering oceans. A number of recent and emerging studies have added to the study of carbon cycle observations and relevant processes, and their syntheses, in these sensitive environments. Both observational and modeling studies are encouraged to apply.

**Primary Chair:  Burke R Hales**, Oregon State University, Corvallis, OR, United States

**Co-chairs:  Kumiko Azetsu-Scott**, Bedford Inst Oceanography, Dartmouth, NS, Canada, **Wiley Evans**, Hakai Institute, BC, Canada and **Leif G Anderson**, Univ Gothenburg, Goteborg, Sweden

## [HE003. Freshwater Fluxes in the Arctic Ocean – North Atlantic Climate System](https://agu.confex.com/agu/os18/preliminaryview.cgi/Session23525)

**Session ID#:**23525

##### Session Description:

Oceanic and sea ice freshwater fluxes in the Arctic Ocean – North Atlantic climate system impact thermohaline and convective processes, with far-reaching influence on climate. Increased freshwater fluxes to the Arctic Ocean along with the wind-driven anticyclonic circulation have resulted in growing freshwater content in the Beaufort Gyre. There is no observational evidence of significant changes in freshwater fluxes between the Arctic Ocean and the North Atlantic. Yet freshwater flux from the Greenland Ice Sheet is clearly increasing and may be impacting thermohaline processes in the North Atlantic. It is a priority to discern the driving mechanisms, the role and consequences of changing freshwater fluxes into the Arctic Ocean and North Atlantic. This session solicits papers addressing issues related to oceanic freshwater fluxes (liquid and sea ice) in the Arctic Ocean – North Atlantic climate system. Possible topics include: Propagation mechanisms, pathways and time scales of fresh water anomalies; residence time of fresh water; impacts of changes to the cryosphere; the role of freshwater in the future Arctic climate; the sensitivity of thermohaline circulation to freshwater fluxes; the relationship between sea ice and freshwater content in the ocean; and, biological and environmental consequences of increased freshwater fluxes.

**Primary Chair:  Dmitry S Dukhovskoy**, Florida State University, Tallahassee, FL, United States

**Co-chairs:  Paul Glen Myers**, University of Alberta, Edmonton, AB, Canada, **Camille Lique**, Laboratoire d'Océanographie Physique et Spatiale, IUEM, Plouzané, France and **Thomas W N Haine**, Johns Hopkins University, Earth and Planetary Sciences, Baltimore, MD, United States

## [HE004. Ice-Ocean Interactions and Circulation around the Antarctic Margins](https://agu.confex.com/agu/os18/preliminaryview.cgi/Session23179)

**Session ID#:**23179

##### Session Description:

Processes occurring at or close to the ice-ocean interface around Antarctica influence the state and circulation of a large proportion of the global ocean. The annual cycle of sea ice formation, export and melt is critical to the formation of both Antarctic Bottom Water and Antarctic Intermediate Water, which together fill more than half of the global sub-surface ocean. Inflow of warm Circumpolar Deep Water beneath floating shelves of marine-terminating glaciers promotes retreat of the grounded portion of the ice sheet, and thus sea level rise. Though historically limited by the prohibitive costs of in situ observations and high-resolution models, recent field campaigns and focused model development efforts are now rapidly advancing our understanding of these processes. This session will showcase recent advances in understanding the physical processes occurring in the Antarctic marginal seas, across the Antarctic continental shelf and slope, and within the ocean cavities beneath floating ice shelves. Studies based on observations, numerical models and theory are all welcome. The authors particularly encourage submissions addressing ocean-sea ice interactions, warm water pathways from continental slope to grounding zones, and inter-connectivity between sectors of the Antarctic margins and the broader Southern Ocean.

**Primary Chair:  Andrew Stewart**, University of California Los Angeles, Los Angeles, CA, United States

**Co-chairs:  Andrew F Thompson**, California Institute of Technology, Pasadena, CA, United States, **Louise C Biddle**, University of Gothenburg, Sweden and **Matthew H England**, University of New South Wales, Climate Change Research Centre, Sydney, Australia

## [HE005. Linkages among changes in physical and biogeochemical processes in the Eurasian sector of the Arctic Ocean](https://agu.confex.com/agu/os18/preliminaryview.cgi/Session27518)

**Session ID#:**27518

##### Session Description:

Marked changes in the eastern Eurasian Basin have occurred in the last few years, including a reduced stratification due to a weak (or absent) cold halocline layer, shoaling of the Atlantic layer and increased winter ventilation of the ocean interior, and a reduction in the sea ice cover that rivals the large losses observed in the Chukchi Sea and Canada Basin.  These changes represent a transition of the Arctic to a new, more dynamic climate state, with the eastern Eurasian Basin becoming more structurally similar to the western Eurasian Basin.  These ongoing changes have important implications for physical (e.g., heat budget, sea ice cover) and biogeochemical (e.g., nutrient availability, primary production, carbon cycling) processes in the Eurasian sector of the Arctic Ocean.

We invite abstracts that explore changes to the physical and/or biogeochemical processes of the Eurasian Basin as well as the links and feedbacks between these processes such that present and future change in this region of the Arctic Ocean may be better understood and predicted.  We welcome submissions based on observations, models, and a combination of the two.  While abstracts may focus on physical, biological, or chemical processes, we particularly encourage interdisciplinary submissions.

**Primary Chair:  Matthew Buckley Alkire**, University of Washington Seattle Campus, Seattle, WA, United States

**Co-chairs:  Igor Polyakov**, **Andrey Pnyushkov** and **Robert Rember**, University of Alaska Fairbanks, Fairbanks, AK, United States

## [HE007. Melting of glaciers, icebergs, ice shelves, and coastal permafrost and impacts on physical properties and biogeochemistry of the ocean](https://agu.confex.com/agu/os18/preliminaryview.cgi/Session29774)

**Session ID#:**29774

##### Session Description:

Rapid changes at both poles have increased the importance of physical and chemical interactions that occur between the ocean and ice shelves, glaciers and icebergs. Exchanges of heat and freshwater exert feedbacks on terrestrial ice loss, and marine ice concentration. Glacial meltwater can alter ocean stratification, circulation, and biological productivity. The chemical load transported via subglacial and englacial waters can be a major vector for the supply of iron and other limiting nutrients to the marine ecosystem. Temperature and sea level rise increase the erosion of coastal and shallow subsea permafrost leading to oceanic delivery of terrestrial organic compounds and other permafrost-trapped chemical species. The effects of these melt processes on ecosystem biomass and community structure/activity are poorly known, as is the spatial extent of these impacts. We also know very little about how seasonal, episodic and anticipated future losses will manifest in ocean circulation and coastal ecosystems.

Building on recent contributions to our understanding of relevant processes, this session seeks to bring together multi-disciplinary researchers engaged in observing and modeling these ice-ocean interactions in polar regions, including those around Greenland and Antarctica, and their impact on ocean physics, chemistry and biology.

**Primary Chair:  Fiammetta Straneo**, Scripps Institution of Oceanography, La Jolla, CA, United States

**Co-chairs:  Virginia P Edgcomb**, Woods Hole Oceanographic Inst, Woods Hole, MA, United States, **Brice Loose**, URI GSO, Graduate School of Oceanography, Narragansett, RI, United States and **Claudia Cenedese**, Woods Hole Oceanographic Institution, Woods Hole, MA, United States

## [HE008. North Atlantic – Nordic seas – Arctic Ocean heat exchanges: Processes and Impacts](https://agu.confex.com/agu/os18/preliminaryview.cgi/Session29748)

**Session ID#:**29748

##### Session Description:

Exchange flows between the subpolar North Atlantic and the Arctic Ocean via the Nordic Seas are key components of the global climate system. The southward deep overflows feed the abyssal limb of the Atlantic Meridional Overturning Circulation affecting global climate, and the northward heat transport by the Atlantic Water affects Arctic sea ice and land ice cover, ecosystems, European weather and global climate. While knowledge of the magnitude of these fluxes and of their driving mechanisms are key to predicting changes on both the Atlantic and the Arctic sides, the processes and timescales involved are poorly understood.

This session invites contributions that address any of the exchange flows, their driving mechanisms, and downstream impacts of changes on either the Atlantic or the Arctic side. It aims to bring together observational, theoretical and numerical work on issues including but not limited to dynamics and kinematics of the regional ocean circulation, local and remote impacts of changes in oceanic heat transports on the atmosphere, sea ice, marine terminating glaciers, and biogeochemistry, and their linkages and predictability.

**Primary Chair:  Renske Gelderloos**, Johns Hopkins University, Baltimore, MD, United States

**Co-chairs:  Céline Heuzé**, University of East Anglia, Norwich, United Kingdom, **Marius Årthun**, Bjerknes Centre for Climate Research, Bergen, Norway and **Kerstin Jochumsen**, University of Hamburg, Hamburg, Germany

## [HE010. Response of the southern ocean, sea-ice and ice shelves to the changing climate](https://agu.confex.com/agu/os18/preliminaryview.cgi/Session28310)

**Session ID#:**28310

##### Session Description:

The Southern Ocean plays an important role in the exchange of heat, carbon and nutrients between the atmosphere, surface and deep oceans, and changes in the Antarctic cryosphere. Thus, understanding how the southern ocean responds to external forcing is critical to our understanding of the climate system and climate change.  We invite presentations from observational and modeling studies that increase our understanding of the physical, chemical, and biological processes of the Southern Ocean, linkages between these processes, ocean-atmosphere and ocean-ice interactions, and the responses of these processes and interactions to changes in climate.

**Primary Chair:  Darryn Waugh**, Johns Hopkins University, Baltimore, MD, United States

**Co-chairs:  John Marshall**, Massachusetts Institute of Technology, Cambridge, MA, United States, **Marika M Holland**, National Center for Atmospheric Research, Boulder, CO, United States and **Ryan Abernathey**, Columbia University of New York, Palisades, NY, United States

## [HE011. Similarities and differences of Ocean dynamics at both ends of the globe](https://agu.confex.com/agu/os18/preliminaryview.cgi/Session24134)

**Session ID#:**24134

##### Session Description:

The Arctic and the Southern oceans share many similarities: they are affected by large-scale annular modes of atmospheric variability, both are (seasonally) ice-covered and insulated from atmospheric variability, constrained by land to the north or south but are unbounded zonally, and bordered by ice-sheets.

The dynamics in these two oceans share also many characteristics. This notably includes a small Rossby deformation radius, the co-existence of areas with very strong and very weak stratification, the constraints of bottom bathymetry for the large-scale circulation, the presence of diapycnal mixing “hot spots”, the existence of strong boundary currents and a key role for eddies in setting the mean and adjustment timescale of the large-scale circulation.

Despite these similarities, important differences in the behavior of these two regions have been observed, including sea ice trends of the past decades of opposite signs. Differences in stratifications, mixed layer processes, geometry, and forcings (e.g. ozone hole) have been suggested as possible causes.

In this session, we invite contributions from observationalists, modelers and theoreticians, focusing on all aspects of the dynamics in the Arctic or the Southern Ocean (or ideally both). The goal is to share concepts and ideas transferable from one pole to the other.

**Primary Chair:  Camille Lique**, Laboratoire d'Océanographie Physique et Spatiale, IUEM, Plouzané, France

**Co-chairs:  Helen Louise Johnson**, University of Oxford, Department of Earth Sciences, Oxford, United Kingdom, **Andrew Hogg**, Australian National University, Canberra, ACT, Australia and **David Ferreira**, University of Reading, Reading, RG6, United Kingdom

## [HE012. The Connections Among Changes in the Arctic Ocean, World Ocean, and Climate](https://agu.confex.com/agu/os18/preliminaryview.cgi/Session28558)

**Session ID#:**28558

##### Session Description:

The Arctic Ocean has changed substantially in recent decades. Circulation, salinity, and temperature have changed and the sea ice has shown alarming declines. Connections between these changes and global and regional indices of atmospheric variability have been suggested. Conversely, Arctic Ocean changes are thought to affect global climate by modifying the global radiative heat balance through ice-albedo feedback and by impacting the strength of the global overturning circulation. Ocean-ice sheet interaction is thought to be important in the accelerated mass loss of the Greenland ice sheet. Discussion of the links between Arctic Ocean changes and global environmental changes has arguably never been timelier. The Winter 2016-2017 has seen record warm winter atmospheric temperatures, a record minimum amount of multiyear sea ice, and record minimum winter sea ice extent. These record extremes set the conditions for a massive sea ice retreat in summer 2017. This special US CLIVAR session will examine the connections among recent changes in the Arctic Ocean, the sub-Arctic seas, global ocean, ice sheets, and global climate. A short panel discussion will follow at the end of the session.

**Primary Chair:  James Morison**, Polar Science Center, Seattle, WA, United States

**Co-Chair:  Josh K Willis**, NASA Jet Propulsion Laboratory, Pasadena, CA, United States

## [HE014. The role of small-scale processes in the dynamics of the changing Arctic Ocean](https://agu.confex.com/agu/os18/preliminaryview.cgi/Session27542)

**Session ID#:**27542

##### Session Description:

The Arctic Ocean and sea ice are undergoing marked changes under continued global warming. Observations indicate that Arctic Ocean circulation, stratification, freshwater, and heat content have been changing in response to atmospheric winds, reduced sea ice cover, increased solar warming, changing freshwater sources, and advection of heat from the Pacific and Atlantic oceans. Ocean heat and salt transport by flows at all scales are contributing to sea-ice losses, the distribution and storage of freshwater, and associated feedbacks across the Arctic. Basin-scale changes are profoundly affected by small-scale ocean processes such as mesoscale and submesoscale turbulence, wave breaking and vertical mixing. This session invites submissions that explore the influence of small-scale processes on sea ice and large-scale Arctic Ocean dynamics and thermodynamics. We welcome theoretical, observational, and modeling studies on eddies, waves, mixing and stirring, and their impact on basin-scale Arctic variability and change.

**Primary Chair:  Georgy Manucharyan**, California Institute of Technology, Environmental Sciences and Engeiering, Pasadena, CA, United States

**Co-Chair:  Mary-Louise Timmermans**, Yale University, New Haven, CT, United States

# Ocean Observatories, Instrumentation and Sensing Technologies

## [IS003. From watersheds to the open ocean: advances in remote sensing for monitoring water quality, food security, ecosystems, and change](https://agu.confex.com/agu/os18/preliminaryview.cgi/Session29817)

**Session ID#:**29817

##### Session Description:

Marine, coastal, and inland waters provide a range of societal benefits including food and water supply, economic support, and ecosystem biodiversity and productivity. However, these resources are increasingly stressed due to natural and anthropogenic factors. Remote sensing from ground-based, airborne, and satellite platforms offers a unique perspective on the world's water bodies, with the ability to assess quality, safety, and change at improved temporal resolutions, and at scales that extend from inland waters to the open ocean.

Active and passive sensors with improved radiometric performance and spatial, spectral, and temporal resolutions open up possibilities for detailed quantitative understanding of various physical and/or biogeochemical processes. Recent and future advances in remote sensing include instrumentation as well as algorithm development, synergies, and applications. We welcome submissions illustrating innovative methods of processing or applying remotely sensed data that highlight benefits to society. These include measuring and monitoring water quality, food security, ecosystem biodiversity and productivity, and physical properties (e.g.: wind, salinity, and currents). Topics such as atmospheric correction, algorithm design, object detection, bio-optical modelling of optically complex waters, and generation of tools and data products best suited to end-users for effective management of water/marine resources are encouraged.

**Primary Chair:  Lauren Biermann**, Cefas, Remote Sensing of Ecosystems and Environment, Lowestoft, United Kingdom

**Co-chairs:  Wesley Moses**, Naval Research Laboratory, Remote Sensing Division, Washington, DC, United States, **Chris Banks**, National Oceanography Center, Liverpool, United Kingdom and **Kevin Ross Turpie**, University of Maryland Baltimore County, Joint Center for Earth Systems Technology, Baltimore, MD, United States

## [IS005. Increasing Success of Underwater Glider Missions.](https://agu.confex.com/agu/os18/preliminaryview.cgi/Session28052)

**Session ID#:**28052

##### Session Description:

With the advancement of underwater glider technologies and applications, the ocean observing community is examining means to encourage greater collaboration with decision-makers, glider operators, and data users. National and international delegates congregated at the IOOC US Underwater Glider Workshop in January 2017 to identify methods to enhance coordination, addressing science, technical, and data gaps. This session is intended to allow glider operators and data managers to present on how they are improving overall success of glider missions within the areas of ocean monitoring, operational reliability, data management, and interagency and international coordination.

**Primary Chair:  Barbara A Kirkpatrick**, Gulf of Mexico Coastal Ocean Observing System, Sarasota, FL, United States

**Co-Chair:  Becky Baltes**, US IOOS Program, Silver Spring, MD, United States

## [IS006. Innovative and Emerging Research Technologies with proven or potential for High Impact in the Marine Sciences](https://agu.confex.com/agu/os18/preliminaryview.cgi/Session28464)

**Session ID#:**28464

##### Session Description:

We would like to invite abstracts that describe technologically innovative or transformative scientific practices, new and exciting data acquisition methods and analytical approaches, or present the results of successful technology demonstration projects that leverage new engineering or computing developments to advance research in marine science.

We hope that the presentations will focus on innovative and emerging technologies that have potential to increase the efficiency and productivity of scientific marine research and to achieve a more comprehensive understanding of the ocean.

Such advancements may include intelligent applications of new technologies, automated machine learning, new sensing technologies, seafloor imaging, and innovative samplers being deployed on research vessels, as robotic platforms, part of observing systems, or in shoreside laboratories. It is the goal of the session to illuminate a variety of emerging technological capabilities and opportunities for advancing oceanographic research, showcasing the potential to change the way marine research is conducted in the near future.

**Primary Chair:  Leonard J Pace**, Schmidt Ocean Institute, Washington, DC, United States

**Co-chairs:  Allison Miller**, Schmidt Ocean Institute, Palo alto, CA, United States and **Victor Zykov**, Schmidt Ocean Institute, Palo alto, CA, United States

## [IS009. New Advances in Ocean and Climate Sciences Driven by Underway Measurements of Ocean and Atmospheric Properties](https://agu.confex.com/agu/os18/preliminaryview.cgi/Session22550)

**Session ID#:**22550

##### Session Description:

Recent years have seen increasing efforts to collect and quality-control underway measurements made from research vessels and ships of opportunity. Underway measurements capture sub-kilometer-scale to kilometer-scale variability of physical, biological and chemical properties of the near-surface ocean and lower atmosphere. These measurements have led to new insights into local- and basin-scale dynamics, and also provide a means of quantifying sub-pixel-scale variability in satellite measurements. The aim of this session is to bring together researchers working with different types of underway measurements (including but not limited to thermosalinographs, meteorological, chemical and aerosol sensors, bio-optical sensors, and flow cytometers). This session will focus on how these diverse sensing technologies have been used to address research questions in ocean ecology, biogeochemistry, physical oceanography, and atmospheric sciences. We particularly welcome contributions that describe cross-disciplinary applications and merge data streams from multiple platforms or expeditions, or that use new advances in data streaming/processing and data archiving.

**Primary Chair:  Sophie Clayton**, University of Washington, School of Oceanography, Seattle, WA, United States

**Co-chairs:  Kyla Drushka**, Applied Physics Laboratory, University of Washington, Seattle, WA, United States, **Angelicque E White**, Oregon State University, Corvallis, OR, United States and **Rachel HR Stanley**, Wellesley College, Chemistry, Wellesley, MA, United States

## [IS010. New Platform and Sensor Technologies: Advancing Research, Readiness and Transitioning for Sustained Ocean Observing of Essential Ocean Variables](https://agu.confex.com/agu/os18/preliminaryview.cgi/Session28739)

**Session ID#:**28739

##### Session Description:

The rate of technological evolution in ocean and marine environment sensors and platforms has increased dramatically. Similarly, requirements are evolving and demand for integrated routine observations to address climate, ocean services and ocean health needs is increasing. New autonomous and guided platforms are expanding our operating envelope; improving the diversity of observed variables recorded aboard a single platform and improving efficiencies. Sensor development is benefitting from technical advances across a range of disciplines, including those external to oceanography. These developments offer potential benefits within the sustained ocean observing system of the global and coastal oceans. This session offers an opportunity for the ocean observing technology and stakeholder communities to share technology advances towards addressing GOOS Essential Ocean Variable requirements and key research/marine service needs; identify successful approaches towards transitioning these technologies into sustained observing systems; and identify opportunities to improve the coordination and pace of integrating technologies into sustained observing. Additional questions that could be addressed include: What are the bottlenecks to development? How to source and integrate advanced technologies from other sectors? What are the successful economic models from development into sustained observing? What role should observing networks, government, academia, industry and the philanthropic sector play?

**Primary Chair:  David M Legler**, NOAA, Climate Program Office, Silver Spring, MD, United States

**Co-chairs:  Emma E Heslop**, SOCIB, Palma, Spain, **Christian Meinig**, NOAA Pacific Marine Environmental Laboratory, Seattle, WA, United States and **Matthew C Mowlem**, National Oceanography Centre, Ocean Technology and Engineering Group, Southampton, United Kingdom

## [IS011. Ocean Observatory Science – From Events to Climat](https://agu.confex.com/agu/os18/preliminaryview.cgi/Session27547)e

**Session ID#:**27547

##### Session Description:

We invite presentations that highlight and demonstrate all aspects of ocean observatory science. Observatories include cabled systems (e.g. ONC, OOI RCA, MVCO, LoVe, DONET), long-term time series (e.g. HOTS, BATS, ESTOC), coastal mooring arrays (e.g. the OOI Endurance and Pioneer Arrays), High Frequency Radar installations, and remote ocean sensing arrays (e.g. Argo and the OOI Global Arrays). Observatory data now include both decade long time series and broad regional spatial coverage, support interdisciplinary studies, and enable scientific investigations of marine processes, event detection, and climate assessment. We particularly encourage new and innovative research approaches and results that utilize or are only possible using ocean observatory systems. Other emphases include novel uses of high data rate sources, installations at unique sites (i.e. undersea volcanoes), continuous long-term time series, new insights into rapid environmental change, merging fixed and mobile observing systems, and observations of recent events such as the North Pacific warm anomaly, Harmful Algal Blooms, hypoxia, and the eruption of Axial Seamount.

**Primary Chair:  Richard K Dewey**, Ocean Networks Canada, Victoria, BC, Canada

**Co-chairs:  Jack A Barth**, Oregon State University, College of Earth, Ocean, and Atmospheric Sciences, Corvallis, OR, United States, **Deborah S Kelley**, University of Washington Seattle Campus, Seattle, WA, United States and **John H Trowbridge**, Woods Hole Oceanographic Institution, Woods Hole, MA, United States

## [IS012. Sea Surface Roughness Observed by High Resolution Radar](https://agu.confex.com/agu/os18/preliminaryview.cgi/Session28340)

**Session ID#:**28340

##### Session Description:

Changes in the sea surface roughness are usually associated with a change in the sea surface wind field. This interaction has been exploited to measure the sea surface wind speed by scatterometry. A number of features on the sea surface associated with change in roughness can be observed on synthetic aperture radar (SAR), because of the change in Bragg backscatter of the radar signal by damping of the resonant ocean capillary waves. The change in sea surface roughness can also be observed in the sun glint area of optical imagery. With various radar frequencies, resolutions, and modes of polarization, sea surface features have been analyzed in several campaigns, bringing very different datasets together thus allowing for new insight in small scale processes at a larger areal coverage. This session aims at investigating sea surface features including but not limited to: upwelling, oceanic fronts, coastal processes on reefs, lee waves, swell, wind shadows, wind rolls, internal structures of hurricanes, oil seepage and natural slicks, internal waves, and turbulent effects due to wakes. Studies on turbulent features at the air-sea interface at a resolution below 10 m using a combination of remote sensing, in situ and modeling techniques are encouraged.

**Primary Chair:  Atsushi Fujimura**, University of Guam, Marine Laboratory, Mangilao, Guam

**Co-chairs:  Susanne Lehner**, German Aerospace Center (DLR), Remote Sensing Technology Institute, Oberpfaffenhofen, Germany, **Alexander Soloviev**, Nova Southeastern University, Dania Beach, FL, United States and **Charles L Vincent**, University of Miami, Rosenstiel School of Marine and Atmospheric Science, Miami, FL, United States

## [IS013. Technology Advances in Deep Ocean Observing](https://agu.confex.com/agu/os18/preliminaryview.cgi/Session28539)

**Session ID#:**28539

##### Session Description:

Challenges for observing the deep ocean are to expand existing sensors and platforms to greater depth, resolve smaller signals, correct for pressure-induced error, and develop new technologies for measuring deep-ocean specific essential ocean variables.

This session solicits abstracts on sensors and platforms advancements for deep observations to address

1. the role of the deep ocean in the Earth's heat and freshwater budgets, carbon cycle, and sea level change,
2. deep-ocean circulation and mixing,
3. deep water mass formation,
4. the fluxes of nutrients, tracers, oxygen, and carbon in the deep ocean,
5. the response of (i-iv) to natural and anthropogenic stress factors.
6. Abstracts on related system modeling such as observing system experiments are welcome.

**Primary Chair:  Nathalie V Zilberman**, University of California San Diego, Scripps Institution of Oceanography, La Jolla, CA, United States

**Co-chairs:  Bruce M Howe**, University of Hawaii at Manoa, Honolulu, HI, United States and **Matthew H Alford**, University of California San Diego, Scripps Institution of Oceanography, La Jolla, CA, United States

# Ocean Data Management

## [OD006. Real-Time Quality Control of Oceanographic Data Emerging Technologies and their Data QC Practices](https://agu.confex.com/agu/os18/preliminaryview.cgi/Session28782)

**Session ID#:**28782

##### Session Description:

When operational oceanographic data are provided to users in real time, it is imperative that automated quality control is performed on those observations. By reducing the dissemination of flawed values and highlighting questionable ones, users gain confidence in the data stream. Further, the operator benefits from early detection and subsequent repair of sensor/system failures, improving data return rates. Researchers and the operational community are engaged in developing, consolidating, and documenting procedures and sharing implementation experiences. We solicit abstracts relating to QC plans, expectations, and best practices, in regional and global contexts, for emerging technologies striving to achieve an interoperable capability and an operational status. The described QC techniques should be specific to the emerging technology, adhering to existing standards or introducing new standards if necessary. Potential topics include: supporting real-world solutions through the implementation of QARTOD tests or other QC information within observing system networks (ex. OOI, IOOS, Cabled Observatories, NERRS CDMO, etc.); Regional QA/QC standards development by operators and/or vendors; and data management of QC information. Case studies and lessons learned that describe any aspects of quality control are also encouraged.

**Primary Chair:  Mark Bushnell**, NOAA/NOS/CO-OPS, Chesapeake, VA, United States

**Co-chairs:  Julie Thomas**, University of California San Diego, La Jolla, CA, United States, **Jay Pearlman**, University of Colorado at Boulder, Boulder, CO, United States and **Matthew Howard**, Texas A & M University College Station, College Station, TX, United States

# Ocean Modeling

## [OM002. Advances in Data Assimilation and Uncertainty Quantification for Ocean Forecasting and Analysis](https://agu.confex.com/agu/os18/preliminaryview.cgi/Session27795)

**Session ID#:**27795

##### Session Description:

Data assimilation and uncertainty quantification are vital for ocean forecasting and reanalysis. They are also widely used for model calibration (including parameter inference) and observation systems design. The challenges in this area are numerous due to the paucity of observations, nonlinear dynamics and interactions at multiple spatio-temporal scales, involved numerical dimensions, and also uncertainties due to the resolution of physical processes, parameterizations, and inputs. The goal of this session is to bring together researchers working on the development and applications of ocean data assimilation and uncertainty quantification to discuss recent advances in the field. Contributions concerning the following issues are of particular interest:

* New technical developments and original applications of ocean data assimilation and uncertainty quantification
* Pushing the limits of predictability, through stochastic parameterization and in term of targeting submesoscales and extended forecasting windows
* Coupled data assimilation, including ocean-atmosphere, ocean-waves and ocean-biogeochemical systems
* Estimation and uncertainty quantification of ocean models parameters, inputs, and outputs
* Estimating and accounting for ocean models errors
* Assimilation of new datasets and design of observation systems

**Primary Chair:  Ibrahim Hoteit**, King Abdullah University of Science and Technology, Physical Sciences and Engineering, Thuwal, Saudi Arabia

**Co-chairs:  Mohamed Iskandarani**, University of Miami - RSMAS, Miami, FL, United States, **Bruce D Cornuelle**, University of California San Diego, La Jolla, CA, United States and **Matthew Carrier**, Naval Research Laboratory, Stennis Space Center, MS, United States

## [OM004. Ensemble Modeling Approaches in Physical and Biogeochemical Oceanography](https://agu.confex.com/agu/os18/preliminaryview.cgi/Session28471)

**Session ID#:**28471

##### Session Description:

Ensemble modeling methods have been applied to a wide range of oceanographic and climate questions since their original application in numerical weather preduction several decades ago.  Such applications currenty encompass not only climate projections (pertaining to detection and time of emergence) and predictability/prediction studies, but also forecast modeling (operational oceanography) and data assimilation.  Additionally, ensemble methods are applied to physical state variables, ocean biogeochemistry, and potential ocean ecosystem stressors.  As such, the range of applications informs and facilitates collaborative efforts in both the interpretation of an assimilation of observational records.

This session welcomes studies that employ ensemble methods in a wide range of applications relevant to physical and biogeochemical oceanography and the role of the ocean in the climate system.  Abstracts are particularly welcomed that focus on the interplay between ocean physical and biogeochemical processes, proceses in high-latitude environments, and studies of marine ecosystems under a changing climate.

**Primary Chair:  Keith B Rodgers**, Princeton University, Princeton, NJ, United States

**Co-chairs:  Thomas L Froelicher**, ETH Swiss Federal Institute of Technology Zurich, Zurich, Switzerland, **Tatiana Ilyina**, Max Planck Institute for Meteorology, Hamburg, Germany and **Nicole S Lovenduski**, University of Colorado, Boulder, CO, United States

## [OM005. High-Resolution Ocean Modelling for Ocean-Ice Sheet Interaction Studies around the Greenland and Antarctic Ice Sheets](https://agu.confex.com/agu/os18/preliminaryview.cgi/Session22287)

**Session ID#:**22287

##### Session Description:

Investigating how hydrograhpic variability modulates the melting of the Greenland and Antarctic Ice Sheets with numerical ocean models requires simulations of ocean circulation and exchange processes that span from the basin scale (1000 of km) to the ice shelf cavity or fjord scale (10 km to 100 m). Although valuable progress has recently been made by studying ocean-ice sheet interaction using numerical models with both idealized and realistic geometries and forcings, many unanswered questions remain. This timely session will bring together researchers working in this field with the goal of accelerating progress by facilitating the exchange of scientific findings and technical ideas. Specifically, it is hoped that this session will help shed light on outstanding questions relating to the importance of decadal to seasonal scale hydrographic variability in the (1) North Atlantic Subpolar Gyre, Greenland-Iceland-Norwegian Seas, and the Baffin Bay on anomalous melting of the Greenland Ice Sheet and in the (2) Southern Ocean on anomalous melting of the West Antarctic Ice Sheet and potential 'hot spots' around East Antarctica. Finally, the research shared in this session will help to advance the design of ocean observation systems that will be required to monitor future ocean-ice sheet interactions.

**Primary Chair:  Ian G Fenty**, NASA Jet Propulsion Laboratory, Pasadena, CA, United States

**Co-chairs:  Eric J Rignot**, University of California Irvine, Earth System Science, Irvine, CA, United States and **Michael Schodlok**, Jet Propulsion Laboratory, Pasadena, CA, United States

## [OM006. Integrating Observations of Plankton Communities and Physiology into Numerical Models](https://agu.confex.com/agu/os18/preliminaryview.cgi/Session28485)

**Session ID#:**28485

##### Session Description:

Plankton exhibit a very broad range of morphology, physiological capabilities, life histories, and biological interactions. This diversity, in turn, influences biogeochemical functions across marine ecosystems. Our understanding of ecosystem alterations in the face of global environmental change hinges on observations of plankton assemblages and their physiological characteristics. These observations range from light-based measurements such as microscopy, flow cytometry and remote sensing to molecular and isotopic tools providing evidence about metabolic potential and rates. Some of the most novel, recent advances in linking plankton ecology to biogeochemical function were made possible by including observational and laboratory data into numerical models, and testing model predictions against field observations. However, more synergistic research such as this is needed, as these models also test the limits of our understanding and can point to key interactions and processes where further advances can be made. Here we invite contributions that specifically integrate plankton observational data into numerical models and deliver new insights into the way plankton diversity and community structure impact marine biogeochemical cycling, or identify areas where particular types of measurements are needed to advance understanding. This session welcomes contributions from taxonomically and methodologically diverse backgrounds and aims to synergize empirically and theoretically-oriented researchers.

**Primary Chair:  Nicolas Van Oostende**, Princeton University, Department of Geosciences, Princeton, NJ, United States

**Co-chairs:  Andrew Barton**, Princeton University, Princeton, NJ, United States, **Charles A Stock**, Geophysical Fluid Dynamics Laboratory, Princeton, NJ, United States and **Raphael Dussin**, Rutgers University New Brunswick, New Brunswick, NJ, United States

## [OM007. Modeling the Climate System at High Resolution](https://agu.confex.com/agu/os18/preliminaryview.cgi/Session28214)

**Session ID#:**28214

##### Session Description:

Realistic Earth System Models are the primary means of projecting the Earth’s future climate state. Model development efforts are underway to include novel components and processes, with many efforts holding the potential to play a significant role in reducing model projection uncertainty. These changes include, but are not limited to: land ice and ice shelf models that interact with the ocean; refined representation of ocean mesoscale processes such as boundary currents and transient eddies; weather-scale phenomena in the atmosphere; leads and polynyas in sea ice. We solicit presentations that explore the impacts of such novel components within coupled models, including their impact for baseline and future climate scenarios. The representation of the ocean meridional overturning circulation and deep water formation; air-sea interaction processes such as those related to feedbacks between ocean eddies and atmospheric storm tracks; eddy-mean flow interactions and the transfer of energy across space-time scales; and cryosphere/ocean interactions affecting sea level projections are all of great interest. Comparisons to standard climate model simulations are encouraged, as well as examinations of forced counterpart component model simulations.

**Primary Chair:  Julie McClean**, Scripps Institution of Oceanography, La Jolla, CA, United States

**Co-chairs:  Joellen L Russell**, University of Arizona, Tucson, AZ, United States, **Stephen Matthew Griffies**, Geophysical Fluid Dynamics Laboratory, Princeton, NJ, United States and **Eric Chassignet**, Florida State University, Center for Ocean-Atmospheric Prediction Studies, Tallahassee, FL, United States

## [OM008. Multiscale and multiphysics modeling of coastal and regional ocean processes: Recent progress and challenges for the future](https://agu.confex.com/agu/os18/preliminaryview.cgi/Session29743)

**Session ID#:**29743

##### Session Description:

Coastal ocean flows involve phenomena at dramatically different spatial and temporal scales, ranging from micro-scale phenomena (wave-current interaction, sediment transport, mixing at MHK turbines, and biogeochemistry) to meso-scale (coastal fronts, tides, and storm surge), and beyond. Realistic representations of these processes require ocean models to take on a variety of complicating factors such as complex shoreline geometry and bathymetry; strong baroclinic-barotropic coupling and deviation from hydrostasy; and turbulence, localized buoyancy, and mixing along sharp interfaces. Numerical modeling of coastal ocean flows, although successful, has typically been limited to individual phenomena and relatively narrow scales. More robust and high-fidelity ocean modeling requires novel numerical techniques incorporating all relevant physical scales with multiscale and multiphysics approaches. Computational methods such as adaptive mesh refinement, embedded boundaries, domain decomposition, and model integration have evolved over the last decade to address these complex issues. This session provides a forum to present such techniques, potentially operating together in ocean models, and discuss best practices. We invite contributions addressing theoretical and numerical problems, validation and benchmarking, data assimilation, and applications to idealized and realistic situations.

**Primary Chair:  Alberto D Scotti**, University of North Carolina at Chapel Hill, Marine Sciences, Chapel Hill, NC, United States

**Co-chairs:  Hansong Tang**, City College of New York, Department of Civil Engineering, New York, NY, United States, **Jose Castillo**, San Diego State University, Computational Science Research Center, San Diego, CA, United States and **Edward Santilli**, Philadelphia University, College of Health, Science and Liberal Arts, Philadelphia, PA, United States

## [OM009. Ocean Model Coupling (Air-Ocean, Ice-Ocean, Wave-Ocean) on Subseasonal through Interannual Time Scales to Support the National Earth System Prediction Capability](https://agu.confex.com/agu/os18/preliminaryview.cgi/Session27641)

**Session ID#:**27641

##### Session Description:

Important decisions in sectors ranging from food security and public health, emergency management and national security rely on forecast information globally and at time scales beyond traditional weather limits. Prediction at sub-seasonal to seasonal time scales and beyond require full coupling between the components of the physical earth system. National Earth System Prediction Capability (National ESPC) is a partnership of five Federal agencies collaborating to address research and operational issues, especially coordinated transitions or research to operational or application use, across time scales ranging from synoptic to decadal. The partnership’s focus is on the subseasonal-to-seasonal (S2S) and intraseasonal to interannual (ISI) time range for which both initial conditions and boundary forcings drive the state of the coupled air-ocean-land-ice environment. This session is looking for papers describing improvements to ocean coupling (air-ocean, ice-ocean, wave-ocean) technologies and effective data assimilation for coupled systems, both for weather prediction to support improved S2S/ISI prediction as well as internally consistent ocean and atmosphere modeling. Technologies should improve representation of important coupled phenomena such as MJO, PDO, ENSO, IOD and others.

**Primary Chair:  Jessie C Carman**, NOAA Washington DC, Washington, DC, United States

**Co-Chair:  David McCarren**, Oceanographer of the Navy, Silver Spring, MD, United States

# Past, Present and Future Climate

## [PC001. Advances in understanding marine heatwaves and their impacts](https://agu.confex.com/agu/os18/preliminaryview.cgi/Session28280)

**Session ID#:**28280

##### Session Description:

Marine heatwaves (MHWs) are prolonged periods of anomalously warm seawater temperatures – extreme events that can have notable impacts on marine ecosystems. They occur regionally throughout the global oceans, including marginal seas, continental shelves, and the open ocean. These anomalously warm events arise from local and/or remotely forced mechanisms related to atmospheric, climate, and/or ocean variability. MHWs have been associated with widespread mortality of species in marine ecosystems, major shifts in ecosystem structure, and fisheries closures and quota reductions. In a warming ocean, these events are becoming more relevant as thermal stress approaches or exceeds ecosystem tolerance levels. Long-term, sustained observing systems and in-situ and remotely sensed temperature data are important for detecting, monitoring, and understanding these events. Ocean models have improved our ability to diagnose mechanisms responsible for the extreme warming events. This session welcomes studies on MHWs from physical processes to ecological impacts. Relevant themes include characterization of historical events from observations and/or models, progress in understanding the underlying dynamics in the generation and decay of MHWs, the impacts of climate variability and anthropogenic climate change on MHW occurrence, duration and intensity, improvements in monitoring systems for MHWs, and documentation of impacts on marine ecosystems, fisheries, and aquaculture.

**Primary Chair:  Jessica Benthuysen**, Australian Institute of Marine Science, Townsville, Australia

**Co-chairs:  Eric C. J. Oliver**, Australian Research Council Centre of Excellence for Climate System Science, Sydney, Australia; Dalhousie University, Department of Oceanography, Halifax, NS, Canada, **Ke Chen**, Woods Hole Oceanographic Institution, Department of Physical Oceanography, Woods Hole, MA, United States and **Thomas Wernberg**, The University of Western Australia, UWA Oceans Institute & School of Biological Sciences, Perth, Australia

## [PC002. Causes of Contemporary Sea Level Variability and Change from Global to Coastal Scales](https://agu.confex.com/agu/os18/preliminaryview.cgi/Session27675)

**Session ID#:**27675

##### Session Description:

Quantitative understanding of the causes of sea level variability and change is important for the development of improved sea level projections and forecasts and assessment of related coastal impacts. This session seeks modeling and data analyses that address causes of sea level variability and change on timescales of months to centuries, at the local, regional and global levels. Of particular interest are studies that advance understanding of the connections between the large-scale ocean circulation and coastal sea level, including how climate modes of variability project onto the coastal zone. Other topics of interest include the mass and steric contributions to sea level budgets and their underlying forcing mechanisms and dynamics involving air-sea-ice interactions, and the attribution of regional sea level change to natural and anthropogenic causes.

**Primary Chair:  Rui M Ponte**, Atmospheric and Environmental Research, Lexington, MA, United States

**Co-chairs:  Benoit Meyssignac**, Observatory Midi-Pyrenees, Toulouse, France, **Catia M Domingues**, University of Tasmania, Hobart, Australia and **Detlef Stammer**, University of Hamburg, Hamburg, Germany

## [PC003. El Niño-Southern Oscillation (ENSO) Diversity, Predictability, and Impacts](https://agu.confex.com/agu/os18/preliminaryview.cgi/Session28002)

**Session ID#:**28002

##### Session Description:

The last three boreal winters in the tropical Pacific have exhibited an unlikely and confounding sequence of ENSO states. In the winter of 2014/15, a previously heralded extreme El Niño resulted in only a limited basin-wide warming. This was followed by an extreme El Niño event in the winter of 2015/16, which, however, did not have the strong eastern Pacific warming characteristic of previous extreme events. Also, unlike previous extreme El Niño events, a weaker than expected La Niña followed in 2016 accompanied by an intense warming near the coast of South America (Coastal El Niño) during the 2017 winter. In addition to the unexpected variability during these years, the impacts of ENSO in some remote locations deviated from expectations. These challenges highlight the need for a continued study of ENSO diversity, including its origin, predictability, global impacts, and interactions with anthropogenic climate change. We welcome observational, model, and paleo studies that focus on the challenges brought to light by the recent ENSO sequence, as well as studies of longer-term, multi-decadal ENSO variability, impacts of climate change on ENSO, and general ENSO dynamics.

**Primary Chair:  Aaron F Z Levine**, NOAA Pacific Marine Environmental Laboratory, Seattle, WA, United States

**Co-chairs:  Antonietta Capotondi**, NOAA Boulder, Physical Sciences Division, Boulder, CO, United States and **Kim M Cobb**, Georgia Institute of Technology Main Campus, Earth and Atmospheric Sciences, Atlanta, GA, United States

## [PC004. History and Development of Greenland Ice and Arctic Sea Ice](https://agu.confex.com/agu/os18/preliminaryview.cgi/Session28083)

**Session ID#:**28083

##### Session Description:

Our understanding of the early history and subsequent development of Greenland Ice along with Arctic Ocean sea ice is evolving rapidly.  This program strives to bring interested parties together to discuss these dynamic ideas where we now see Greenland beginning with intermittent ice growth and decay tens of millions of years before previously thought.  The same is true for sea ice in the Arctic Ocean.  Many new tools are being used in this research as well as new core materials and enhanced age models.  Plans are underway for another IODP drilling expedition to the Arctic to supplement ACEX. Arctic records from cores taken across the Arctic are being compared to global records providing a better understanding of the causes for a mid-Eocene initiation of ice on Greenland and in the Arctic Ocean. Yet the more recent rapid wasting of the Greenland Ice Sheet and the diminished extent and duration of the perennial ice cover in the Arctic is of major concern because of the feedbacks to the climate system.  This program invites papers on the development of ice in the Arctic regions since its initiation, its history, and interrelationship with the global climate system.

**Primary Chair:  Dennis A Darby**, Old Dominion University, Norfolk, VA, United States

**Co-Chair:  Aradhna K Tripati**, University of California, Los Angeles, Earth, Planetary, & Space Sciences, Los Angeles, CA, United States

## [PC006. Nano- and Micro-scale Chemical Signatures in the Ocean: Small Signals from Climate and Microbes with a Big Impact](https://agu.confex.com/agu/os18/preliminaryview.cgi/Session28502)

**Session ID#:**28502

##### Session Description:

Recent advances in micro and nano analytical techniques have opened new windows to a rich set of chemical information about the ocean. Whether reconstructing the pace of the ice ages, how the carbon cycle has changed with time, or the flow of metabolites between marine microbes, much of what we are learning about the ocean is based on tiny chemical signatures. Recorded as trace element anomalies, isotopic shifts, 13C and 14N labels, or biomarkers, these chemical signatures reflect how mass and energy move through systems across a range of scales. Some of the new tools that are providing access to small-scale signals include NanoSIMS (as applied to both enriched isotope and trace element experiments), atom probe tomography, laser ablation, near-field IR and Raman mapping approaches, new synchrotorn-based techniques, and ultra high-resolution mass spectrometry. We welcome contributions from researchers applying established nano- or micro-analytical techniques to marine systems, especially correlative imaging methods, as well as scientists developing new approaches. Sharing recent developments across these tools can inspire new applications and help us solve common challenges related to scaling and interpreting these rich data.

**Primary Chair:  Alexander C Gagnon**, University of Washington Seattle Campus, Seattle, WA, United States

**Co-chairs:  Howard J Spero**, University of California Davis, Department of Earth and Planetary Sciences, Davis, CA, United States and **Anne E Dekas**, Stanford University, Stanford, CA, United States

## [PC007. Oceanic Climate and Ecosystem Variability and Change in Eastern Boundary Upwelling Systems](https://agu.confex.com/agu/os18/preliminaryview.cgi/Session28753)

**Session ID#:**28753

##### Session Description:

Coastal climates along the major oceanic eastern boundaries are governed by a complex interplay of alongshore winds and clouds shaped by topography, ocean upwelling and eddies. These factors combine to yield marine ecosystems that are highly productive and diverse, and at the cutting edge of major climate trends including hypoxia and acidification. Future projections of the climate and ecosystem response of EBUS to global change are compromised by poor resolution of the scales of coastal variability. We invite studies of EBUS based on observational analysis and high-resolution earth system models, aimed at characterizing patterns of variability and detection and attribution of trends in climate and ecosystem processes. Studies that identify mechanisms of variability and change are especially encouraged.

**Primary Chair:  Curtis A. Deutsch**, University of Washington Seattle Campus, School of Oceanography, Seattle, WA, United States

**Co-chairs:  James C McWilliams**, University of California Los Angeles, Los Angeles, CA, United States and **Alexander D Hall**, University of California Los Angeles, Los Angeles, CA, United States

## [PC009. The Ocean as a Mediator of Climate and Climate Change](https://agu.confex.com/agu/os18/preliminaryview.cgi/Session28178)

**Session ID#:**28178

##### Session Description:

The ocean plays a key role in shaping Earth’s climate on timescales spanning seasons to millennia. As the largest reservoir of heat and carbon in the climate system, the ocean is critical for seasonal to decadal climate prediction, projecting climate change over the coming centuries, and making sense of the paleoclimate record. The evolution of climate over the next decade depends sensitively on the state of the ocean today and its coupling to the atmosphere. Earth’s response to greenhouse gas forcing over the 21st century hinges on how heat and carbon are taken up and stored by the ocean. And the climate of the Last Glacial Maximum is thought to have been associated with an ocean circulation that is substantially different from today’s. Understanding and accurately predicting climate at all timescales requires realistic representations of how the ocean exchanges energy, momentum, freshwater, and carbon with the other components of the climate system. This session aims to explore large-scale ocean interactions with the atmosphere, cryosphere, and biosphere in both observations and models of varying complexity. We welcome contributions from studies that examine how the ocean mediates the mean climate, climate variability, and climate change in the past, present, and future.

**Primary Chair:  Elizabeth Maroon**, Cooperative Institute for Research in Environmental Sciences, Boulder, CO, United States

**Co-chairs:  Emily Rose Newsom**, California Institute of Technology, Division of Geological and Planetary Sciences, Pasadena, CA, United States and **Kyle Armour**, University of Washington Seattle Campus, Seattle, WA, United States

## [PC010. The Role of the Southern Ocean in the Global Carbon Cycle](https://agu.confex.com/agu/os18/preliminaryview.cgi/Session27989)

**Session ID#:**27989

##### Session Description:

The Southern Ocean is estimated to account for approximately half of the global oceanic sink of anthropogenic carbon, thus playing a key role in the climate system.  Changes in the carbon cycle in this region are also thought to exert a strong influence on glacial-interglacial cycles.  Recent work has highlighted large interannual variability in the Southern Ocean sink, and new observational estimates of the carbon cycle are emerging from biogeochemical floats and atmospheric measurements. The Southern Ocean remains, however, the basin least constrained by observations, with the largest disagreement among climate models and between models and observations. Changes to our understanding of the Southern Ocean carbon cycle have significant implications for the carbon budgets of the atmosphere and land components of the climate system. We invite abstracts that investigate these topics in both the modern and paleo-climate eras, in particular the magnitude and spatial distribution of the different parts of the Southern Ocean carbon cycle; the variability of the carbon cycle on seasonal to decadal timescales and centennial to glacial-interglacial timescales; and the impact on and interactions with the atmosphere, land, and world ocean.

**Primary Chair:  Alison R Gray**, University of Washington, School of Oceanography, Seattle, WA, United States

**Co-chairs:  Laure Resplandy**, Princeton University, Department of Geosciences, Princeton, NJ, United States, **Carolina Dufour**, McGill University, Atmospheric and Oceanic Sciences, Montreal, QC, Canada and **Ralph F Keeling**, University of California-San Diego, Scripps Institution of Oceanography, La Jolla, CA, United States

## [PC011. Towards a 1.5oC World: The Ocean Response](https://agu.confex.com/agu/os18/preliminaryview.cgi/Session28536)

**Session ID#:**28536

##### Session Description:

The Paris Agreement (COP21) has set an aspirational goal of limiting global surface warming to 1.5oC. This goal requires immediate action, with almost all future scenarios indicating that carbon dioxide removal or other geoengineering approaches will be needed. Irrespective of geoengineering measures, emissions must peak in a little over a decade and then rapidly decrease to become zero or even net negative. Given the prominent role of the ocean in storing emitted carbon dioxide and excess heat, the exploration of the potential response of the ocean to a drop in or even negative emissions is of scientific interest and of societal relevance. This session welcomes abstracts exploring the response of the ocean under scenarios aiming towards a 1.5oC world and how it may feed back to the other components of the Earth system. Relevant issues may include hysteresis effects in ocean circulation or sea-ice, the response of the ocean carbon and other biogeochemical cycles, ecological impacts, and potential unanticipated impacts of geoengineering measures.

**Primary Chair:  Ivy Frenger**, GEOMAR Helmholtz Centre for Ocean Research Kiel, Kiel, Germany

**Co-chairs:  David P Keller**, GEOMAR Helmholtz Centre for Ocean Research Kiel, Kiel, Germany and **Andrew Lenton**, CSIRO Hobart, Hobart, Australia

# Physical Oceanography: Mesoscale and Larger

## [PL004. Deep and Abyssal Ocean Circulations in the Pacific: Characterization, Dynamics, and Representation](https://agu.confex.com/agu/os18/preliminaryview.cgi/Session28086)

**Session ID#:**28086

##### Session Description:

Deep and abyssal ocean circulations play an important role in the global ocean circulation system, the distribution of oxygen and nutrients, and long-term global climate variability. However, measurements in the deep layers are still sparse, and hence there are large gaps in our knowledge of deep and abyssal ocean currents. Studies over a wide range of scopes are thus valuable to expanding our understanding. Such studies include, but are not limited to, (1) revealing the structure, characteristics, and variability of deep and abyssal ocean currents, (2) illustrating the influence and constraint of ocean bottom topography on the deep ocean currents, (3) studying on the Pacific deep western boundary current, rotating hydraulics, and dense overflows, (4) studying the underlying physics of deep ocean circulations which facilitate our modeling of deep ocean as well as our interpretation of observational data, and (5) discussing the influence and response of deep ocean currents to the climate change. There is no clear boundary exist between these topics, instead more interaction between them is more than needed and will certainly be beneficial to all. This session welcomes abstracts on observational, theoretical, laboratory, and modeling studies of processes relevant to the Pacific deep and abyssal ocean circulations.

**Primary Chair:  Fan Wang**, Institute of Oceanology, Chinese Academy of Sciences, Qingdao, China

**Co-chairs:  Lawrence J Pratt**, Woods Hole Oceanographic Institution, Woods Hole, MA, United States, **Gunnar Voet**, Scripps Institution of Oceanography, La Jolla, CA, United States and **Jianing Wang**, Institute of Oceanology, Chinese Academy of Sciences, Qingdao, China

## [PL005. From WOCE through CLIVAR to GO-SHIP: Results from Global Repeat Hydrographic Surveys](https://agu.confex.com/agu/os18/preliminaryview.cgi/Session28697)

**Session ID#:**28697

##### Session Description:

As part of the global repeat hydrography effort, researchers from around the world have worked to measure vertical profiles of seawater properties with high spatial resolution, precision, and accuracy approximately once per decade.  These measurements are made along pre-defined sections that cross the major ocean basins.  The first detailed surveys were conducted by the 1990s World Ocean Circulation Experiment (WOCE).  Major sections were repeated in the 2000s as part of the Climate Variability and predictability program (CLIVAR).  Now, the Global Ocean Ship-based Hydrographic Investigations Program (GO-SHIP) is carrying this observation strategy into a third decade.  Repeat hydrographic measurements have proven critical for revealing variability and long term trends in ocean heat content, freshwater cycling, anthropogenic and natural carbon storage, circulation patterns, acidification, nutrient distributions, and other natural and anthropogenic tracers.  These cruises have also provided support for ancillary measurements and other observation programs (e.g. Argo and remote sensing).

In this session, we invite contributions from those who are interpreting these physical, chemical, and biological observations, or using them to construct or validate ocean circulation models or property estimation algorithms.  Submissions from researchers who rely on repeat hydrography cruises for in situ sensor deployments or remote sensor calibration/validation are also invited.

**Primary Chair:  Richard A Feely**, NOAA Pacific Marine Environmental Laboratory, Seattle, WA, United States

**Co-chairs:  Alison M Macdonald**, Woods Hole Oceanographic Institution, Woods Hole, MA, United States, **Leticia Barbero**, University of Miami, Miami, FL, United States and **Toste S Tanhua**, GEOMAR Helmholtz Centre for Ocean Research Kiel, Kiel, Germany

## [PL007. New Insights into the Dynamics of the Western Tropical Indian Ocean](https://agu.confex.com/agu/os18/preliminaryview.cgi/Session27486)

**Session ID#:**27486

##### Session Description:

The circulation in the western tropical Indian Ocean is driven by monsoonal forcing leading to seasonally reversing currents as well as vigorous coastal upwelling and (sub)mesoscale activity, particularly in the Arabian Sea. Regional water masses are created and modified through a combination of extreme air-sea interactions and upper-ocean mixing processes, which may feed back on the Indian monsoon itself. This session will highlight new insights into the physical and biogeochemical interactions of all major western tropical Indian Ocean areas including the Arabian Sea, the Red Sea, the Mozambique Channel, and the Seychelles-Chagos thermocline ridge. Abstracts are also solicited on the connectivity of the western tropical Indian Ocean to adjacent seas such as the Bay of Bengal and the Agulhas region. In particular, we seek contributions that emphasize the use of combined components of the global ocean observing system (including in situ and autonomous measurements as well as remote sensing), innovative standalone observations, or model studies of varied complexity to elucidate the dynamics of the circulation in the western tropical Indian Ocean, the coupled ocean-atmosphere interactions, and the connection to the Indian monsoon variability.

**Primary Chair:  Verena Hormann**, Scripps Institution of Oceanography, La Jolla, CA, United States

**Co-chairs:  Janet Sprintall**, University of California San Diego, La Jolla, CA, United States, **Andrey Shcherbina**, Applied Physics Laboratory University of Washington, Seattle, WA, United States and **Hyodae Seo**, Woods Hole Oceanographic Institution, Woods Hole, MA, United States

## [PL008. Ocean Surface and Internal Tides](https://agu.confex.com/agu/os18/preliminaryview.cgi/Session22859)

**Session ID#:**22859

##### Session Description:

This session solicits papers concerned with observing, predicting, and understanding the dynamics of surface and internal tides in the ocean. Ocean surface tides are largely coherent and narrowband processes which are unique among most oceanic phenomena in the degree to which they can be predicted. But the deviations from predictability can provide insights into non-tidal phenomena, particularly internal tide-eddy interactions, scattering, nonlinearity, and other dynamics leading to the decoherence of tides. Developments in both dynamical and empirical modeling of tides are also finding applications in the de-tiding of diverse ocean measurements, as increased accuracy is both being demanded and attained. Global and regional models and observations of tides are relevant to studies of historical and future tidal mixing, energy production from tidal current streams, regional trends in extreme sea level and flooding, and efforts to link land hydrology and coastal oceanography, with the latter prompted by preparations for the future Surface Water Ocean Topography (SWOT) mission.

**Primary Chair:  Edward Zaron**, Portland State University, Portland, OR, United States

**Co-chairs:  Maarten C Buijsman**, University of Southern Mississippi, Department of Marine Science, Stennis Space Center, MS, United States, **Mattias Green**, Bangor University, Glan Conwy, United Kingdom and **Zhongxiang Zhao**, University of Washington, Seattle, WA, United States

## [PL009. The Driving Forces of the Ocean’s General Circulation](https://agu.confex.com/agu/os18/preliminaryview.cgi/Session28663)

**Session ID#:**28663

##### Session Description:

The focus of this session is on the processes that facilitate the closure of the ocean's general circulation. The processes driving the upper and lower branches of circulation, and interconnecting them are of interest. In particular, the impact of changes in these driving processes on the circulation, thereby on the climate system, on a wide range of time scales will be part of our focus. Example topics of interest include: high latitude coupled dynamics, interior and deep ocean turbulence and mixing, boundary processes and global scale energetics and/or water mass analyses. We encourage contributions that not only focus on physics of processes, but also on their role and interconnections in the large-scale circulation.

**Primary Chair:  Ali Mashayek**, Scripps Institution of Oceanography, La Jolla, CA, United States

**Co-chairs:  Lynne D Talley**, University of California San Diego, La Jolla, CA, United States, **Alberto Naveira Garabato**, University of Southampton, National Oceanography Center, Southampton, United Kingdom and **Colm-cille Patrick Caulfield**, University of Cambridge, BP Institute/Department of Applied Mathematics and Theoretical Physics, Cambridge, United Kingdom

## [PL010. The Fate of Antarctic Bottom Water: Ventilation, Circulation, and Mixing of the Abyssal Ocean](https://agu.confex.com/agu/os18/preliminaryview.cgi/Session28689)

**Session ID#:**28689

##### Session Description:

The bottom limb of the Meridional Overturning Circulation (BMOC) is delineated by the balance between the formation of Antarctic Bottom Water (AABW) through near surface buoyancy loss around Antarctica and the integrated gain of buoyancy and return flow through abyssal diapycnal mixing. The strength of this overturning constrains ocean heat and carbon storage with direct implications for climate.  We invite abstracts on the current state and variability of the production, circulation, and mixing of AABW in the abyssal ocean.  All platforms for observing and modeling the BMOC are welcome, from small-scale experiments to global-scale studies, including AABW formation processes, deep flow interaction with topography, and estimates of rates of deep ocean ventilation and overturning.  Studies may utilize data sets of repeat hydrography, moored arrays, deep Argo floats, or models to infer abyssal flow and properties around the world. Abstracts on the variability of AABW and the BMOC with implications for the global heat, carbon, and sea level rise budgets are particularly encouraged.

**Primary Chair:  Sarah G Purkey**, Scripps Institution of Oceanography, University of California San Diego, San Diego, CA, United States

**Co-chairs:  Emily Rose Newsom**, California Institute of Technology, Division of Geological and Planetary Sciences, Pasadena, CA, United States, **Nathalie V Zilberman**, University of California San Diego, La Jolla, CA, United States and **Louis Clement**, Lamont-Doherty Earth Observatory of Columbia University, Palisades, NY, United States

## [PL011. Transient Eddies, Stationary Meanders and Southern Ocean Circulation and Tracer Transport](https://agu.confex.com/agu/os18/preliminaryview.cgi/Session27717)

**Session ID#:**27717

##### Session Description:

The Southern Ocean is both a critical conduit between the three mid-latitude oceans and a complex frontal system separating warm subtropical waters from cold Antarctic waters. Our understanding of the processes underlying the large-scale Southern Ocean meridional circulation and the associated transport of tracers continues to develop rapidly, while fundamental aspects of the zonal circulation, such as Drake Passage volume transport, are also being reconsidered.

Recent studies have highlighted the important role of both stationary meanders that arise from  mean flow-topography interactions and transient mesoscale eddies in the Southern Ocean, particularly in the saturation and compensation of the wind-driven circulation and in the transport of mass and tracers across fronts. While bathymetry has long been understood to have a role in regulating zonal transport, an emerging view is that meridional transport and upwelling are primarily localized at hotspots tied to major topographic obstacles. These findings support a new paradigm for the Southern Ocean circulation that takes into account the full three-dimensional complexity of the flow.

In this session we welcome observational and modelling contributions that address transient eddies and stationary meanders, their impact on Southern Ocean circulation and transport, and their response to climate change.

**Primary Chair:  Matthew W Hecht**, Los Alamos National Laboratory, Los Alamos, NM, United States

**Co-chairs:  Carolina Dufour**, McGill University, Atmospheric and Oceanic Sciences, Montreal, QC, Canada, **Alison R Gray**, University of Washington, School of Oceanography, Seattle, WA, United States and **Adele K Morrison**, Australian National University, Research School of Earth Sciences, Canberra, Australia

## [PL012. Western Pacific and Indonesian seas circulation and its environmental and climatic impacts](https://agu.confex.com/agu/os18/preliminaryview.cgi/Session28326)

**Session ID#:**28326

##### Session Description:

The western Pacific warm pool is influenced strongly by the western boundary currents of the Pacific Ocean and the Indonesian Throughflow and plays a vital role in the ocean-atmosphere coupled evolution of the tropical oceans. This area has been the focus of recent ocean observations and climate studies aiming to better understand the dynamics and predictability of the variability in the Indo-Pacific ocean circulation and climate. This session seeks contributions on topics including oceanic circulation variability in the western tropical Pacific and eastern Indian Oceans, dynamics of the latest ENSO and IOD events, tropical-extratropical interactions, inter-basin interactions, the Indonesian Throughflow, and air-sea interactions associated with the warm pool. Also encouraged are contributions aimed at understanding the impact of the Indo-Pacific oceans on the variability and predictability of Asian, Australian, and African monsoons, typhoons, and multi-disciplinary studies at times scales ranging from diurnal, intra-seasonal, interannual, and decadal to the centennial impacts of global warming.

**Primary Chair:  Dongliang Yuan**, Institute of Oceanology, Chinese Academy of Sciences, Qingdao, China

**Co-chairs:  William S. Kessler**, NOAA Pacific Marine Environmental Laboratory, Seattle, WA, United States, **Jin-Yi Yu**, University of California, irvine, Dept. of Earth System Sciences, Irvine, CA, United States and **William K Dewar**, Florida State Univ, Tallahassee, FL, United States

# Physical Oceanography: Mesoscale and Smaller

## [PS001. Deep Ocean Communication Through Topographic Pathways](https://agu.confex.com/agu/os18/preliminaryview.cgi/Session28760)

**Session ID#:**28760

##### Session Description:

Flows interact with topography in many ways, from creating internal waves and bottom boundary layers, to modifying the large-scale potential vorticity gradients and causing standing meanders.  Large-scale meanders and their associated storm tracks are mixing hot-spots for cross-front transport of heat and tracers and locations with larger vertical fluxes of momentum and energy, with implications for mixing and bottom drag.  Separately, understanding bottom boundary layers and dissipative process at topography has been improving with higher resolution modeling and observations.  These processes have been studied globally: in the Southern Ocean, western boundary currents, and other locations.  In this session, we aim to connect these two communities and highlight the interconnected dynamics of the eddy/mean flow-topography interaction and bottom boundary layer processes and bridge the gap between their two associated length scales to understand the role of topography in tracer and energy budgets.

**Primary Chair:  Madeleine K Youngs**, Massachusetts Institute of Technology, Cambridge, MA, United States

**Co-chairs:  Xiaozhou Ruan**, California Institute of Technology, Pasadena, CA, United States and **Ali Mashayek**, Massachusetts Institute of Technology, Cambridge, MA, United States

## [PS002. Facing the challenges in interpreting high resolution satellite observations due to the co-existence of internal gravity waves and balanced motions in the world oceans](https://agu.confex.com/agu/os18/preliminaryview.cgi/Session28106)

**Session ID#:**28106

##### Session Description:

Near-inertial waves and internal tides are the dominant modes of high-frequency internal variability in the ocean, and they scatter into a broad-band inertia-gravity wave spectrum. These high-frequency waves are also known to interact with low-frequency motions associated with “balanced” turbulence (including geostrophic mesoscale eddies and sub-mesoscale fronts and vortices with finite Rossby number). Theoretical and numerical studies of the last decade have demonstrated the importance of these interactions for wave dispersion and energy transfer in the 1km-100km scale range, as well as their effects on the spatial variability of mixing and the route to dissipation. Recent studies have further highlighted the potential impacts of these wave-turbulence interactions on not only high-resolution in-situ observations but also high-resolution satellite observations. This concerns SAR images and also observations from future altimetry missions such as the SWOT mission. These impacts point to new scientific challenges for the interpretation of these high-resolution observations in terms of distinguishing waves from balanced currents and deciphering their interactions. The purpose of this session is to review what we know about these interactions, to identify the questions that still need to be addressed, and to consider how to meet these new challenges.

**Primary Chair:  Patrice Klein**, IFREMER, LPO, Plouzané, France

**Co-chairs:  Lee-Lueng Fu**, Jet Propulsion Laboratory, Pasadena, CA, United States, **James C McWilliams**, University of California Los Angeles, Los Angeles, CA, United States and **Rosemary Morrow**, CNES French National Center for Space Studies, Toulouse Cedex 09, France

## [PS003. How do submesoscale and internal wave driven mixing matter on global and regional scales?](https://agu.confex.com/agu/os18/preliminaryview.cgi/Session28096)

**Session ID#:**28096

##### Session Description:

Ocean mixing processes driven by submesoscale dynamics (e.g. mixed layer instabilities, shear instability, etc), internal waves (e.g. nonlinear wave interactions, lee waves, etc), and the interaction between the two are known to have a significant local impact. However, less is known about the importance of these mechanisms on larger scales, including the effect on the water-mass transformation, buoyancy budgets, energy pathways, and subsequent biogeochemistry. This is due to the challenges of observing and modeling these processes accurately with regional and global coverage. This session welcomes abstracts that help investigate the influence of these small-scale processes (occurring at time scales of inertial periods and spatial scales below 10km) on the large-scale by use of observations, modeling, or parameterizations. We hope to initiate discussions that relate to the regional, basin, and global scale effects of submesoscales and internal waves on the physics and biogeochemistry of the ocean.

**Primary Chair:  Mariona Claret**, JISAO/University of Washington, Seattle, WA, United States

**Co-chairs:  Caitlin Whalen**, Applied Physics Laboratory University of Washington, Seattle, WA, United States, **Tyler Hennon**, Scripps Institution of Oceanography, La Jolla, CA, United States and **Cimarron Wortham**, NorthWest Research Associates, Redmond, WA

## [PS004. Interaction between internal waves and multiple-scale dynamics](https://agu.confex.com/agu/os18/preliminaryview.cgi/Session27806)

**Session ID#:**27806

##### Session Description:

Internal waves in the ocean, including inertial internal waves, internal tides and nonlinear internal waves, co-exist with other oceanic phenomena with multiple-scales, such as general circulations, fronts, mesoscale and sub-mesoscale eddies. Since such phenomena have different temporal and spatial scales from internal waves, their dynamics have usually been studied separately. However, more and more evidences reveal apparent interactions between them. Background currents and tilted thermocline associated with geostrophic circulation or mesoscale eddies affect the generation and propagation of internal waves, including reflection, refraction, formation of higher modes and non-linear evolution. As a feedback, internal wave breaking or scattering changes local mixing, thus influencing the genesis and evolution of general circulation and mesoscale eddies. This feedback may be especially important for long-term variations of ocean circulation and climate change, and also provides a roadmap to understand and estimate appropriate dissipation rates for numerical models. This session invites presentations that report recent progress on interactions between internal waves and other dynamical phenomena in the ocean, so as to clarify the energy and momentum route between these processes in different scales. Observational, theoretical and numerical investigations are all welcome.

**Primary Chair:  Qiang Li**, Tsinghua University, Graduate School at Shenzhen, Beijing, China

**Co-chairs:  Xueen Chen**, Ocean University of China, Qingdao, China and **John Huthnance**, National Oceanography Center, Liverpool, United Kingdom

## [PS005. Key Ocean Science Opportunities and Challenges from the SWOT Mission](https://agu.confex.com/agu/os18/preliminaryview.cgi/Session28177)

**Session ID#:**28177

##### Session Description:

The Surface Water and Ocean Topography (SWOT) is a joint mission of NASA and the French Space Agency CNES, with contributions from Canada and the UK.  The primary instrument of SWOT is a Ka-band radar interferometer for measuring the elevation of water surface over land and ocean. The oceanographic objectives of the mission are to observe sea surface height (SSH) at scales approaching 15 km, depending on the sea state.  SWOT will make SSH measurement over a swath of 120 km with a nadir gap of 20 km in a 21-day repeat orbit to map the entire ocean with minimal gaps. The increased spatial resolution over conventional altimetry offers an unprecedented opportunity to study fine-scale 2D ocean surface height processes in the open and coastal oceans. The SWOT fine-resolution SSH 2D images will allow us to address important questions about the ocean circulation and its interaction with higher-frequency processes such as ocean tides and internal waves. The session will address the SSH ocean signal at scales of 15-200 km, from modelling, satellite and in-situ studies, including calibration/validation approach. Studies of open ocean dynamics, coastal, estuarine, and sea-ice processes will be encouraged.

**Primary Chair:  Lee-Lueng Fu**, NASA Jet Propulsion Laboratory, Pasadena, CA, United States

**Co-chairs:  Rosemary Morrow**, CNES French National Center for Space Studies, Toulouse Cedex 09, France and **Patrice Klein**, IFREMER, LPO, Plouzané, France

## [PS006. Recent Advancements in Stratified Turbulent Mixing](https://agu.confex.com/agu/os18/preliminaryview.cgi/Session28090)

**Session ID#:**28090

##### Session Description:

This session will explore recent developments in understanding mixing in stratified turbulent shear flows and its role in ocean circulation. The significance of mixing to the ocean energy cycle has long been recognized. While pioneering work developed a basic understanding of turbulence generated by shear instabilities and its efficiency in overcoming stable stratification, significant advancements have been made in recent years. A new framework based on the concept of Available Potential Energy has shed light on the role of mixing in the ocean energy cycle and its efficiency in flows driven either by shear or convective overturning, both characteristic of intermittent ocean turbulence. Meanwhile, new mechanisms for the development of shear instabilities are being discovered through numerical modeling and observations. In addition, meta-analyses of increasingly resolved DNS and ocean microstructure are leading to improved mixing parameterizations for use in ocean models and interpreting observational data. The talks in this session will span theory, experiments, modeling, and observational approaches to discuss recent advancements, new techniques and outstanding questions in turbulent mixing. We encourage submissions focusing on mixing across a range of ocean scales and settings, including global, coastal and estuarine, and its influence on biogeochemical processes.

**Primary Chair:  Brian L White**, University of North Carolina at Chapel Hill, Marine Sciences, Chapel Hill, NC, United States

**Co-chairs:  Stephen G Monismith**, Stanford University, Civil and Environmental Engineering, Stanford, CA, United States and **Jeffrey R Koseff**, Stanford University, Stanford, CA, United States

## [PS007. Transport and Coherent Structures: New and Traditional Approaches for Studying Ocean Stirring and Mixing](https://agu.confex.com/agu/os18/preliminaryview.cgi/Session27979)

**Session ID#:**27979

##### Session Description:

Ocean flows are dominated by coherent structures, like eddies, with lifetimes longer than typical dynamical timescales. Due to their capacity to transport water and material over long distances, these features play an important role in climate, biogeochemistry, and small-scale mixing. Recently, there has been an influx of powerful techniques from the mathematical literature for identifying coherent structures in ocean flows. These include ideas focussed on Lagrangian flow maps, dynamical systems theory, and set-theoretic approaches involving transfer functions and clustering.

There remain many questions about how these novel ideas are related to traditional metrics of ocean mixing. For example, how can coherent structures improve eddy parameterizations in ocean models? How do sparse sampling, noise, and smoothing impact the identification of coherent structures, which frequently requires the full flow? How can we exploit novel observational approaches such as autonomous robots, clustered drifter releases, or remote sensing?

We invite contributions on transport and coherent structures, including new Eulerian and Lagrangian approaches, numerical modeling studies, observational error assessments, and applications to problems in ocean physics and biogeochemistry. Our hope is to engage a broad swath of the community to help bring these methods to bear on important contemporary problems in oceanography.

**Primary Chair:  Ryan P Abernathey**, Columbia University of New York, Palisades, NY, United States

**Co-chairs:  Irina Rypina**, Woods Hole Oceanographic Institution, Woods Hole, MA, United States, **Jonathan M. Lilly**, Northwest Research Associates, Bellevue, WA, United States and **Shane R Keating**, University of New South Wales, Sydney, NSW, Australia

# Physical Oceanography: Other

## [PO003. Detection, Analysis and Modeling of the Distribution and Transport of Oceanic Debris](https://agu.confex.com/agu/os18/preliminaryview.cgi/Session27646)

**Session ID#:**27646

##### Session Description:

An estimated 8 million metric tons of plastic waste generated on land entered the oceans in 2010, a figure that does not include debris from natural disasters, lost shipping cargo, or derelict fishing gear. Floating debris is a hazard to navigation and poses risks to marine animals and the marine ecosystem. Although contamination by man-made debris is increasingly reported in marine habitats around the world, major gaps remain in understanding the sources, distribution and transport of oceanic debris.

In this session we invite presentations on topics that inform understanding of the distribution and dispersion of oceanic debris of all materials and sizes, including:

* ocean and shelf-sea dynamics at a variety of scales that distribute debris horizontally or vertically;
* the dynamics of buoyant objects in turbulent ocean flow;
* data on characteristics of debris that affect its transport (e.g., size, shape, windage, etc.);
* advances in modeling of debris transport, from coastal regions to the open ocean; and
* assessments of remote sensing tools for detection of floating debris.

**Primary Chair:  Kara L Lavender Law**, Sea Education Association, Woods Hole, MA, United States

**Co-chairs:  Stefano Aliani**, Institute of Marine Sciences CNR, La Spezia, Italy, **Erik van Sebille**, Utrecht University, Netherlands and **Nikolai A Maximenko**, University of Hawaii at Manoa, Honolulu, HI, United States

## [PO005. Multiscale topographic effects on large-scale flow: From wakes and lee waves to small-scale turbulence and mixing](https://agu.confex.com/agu/os18/preliminaryview.cgi/Session27719)

**Session ID#:**27719

##### Session Description:

There has been a resurgence in research on stratified flow over topography in the ocean, with recent evidence suggesting its importance on the large-scale ocean circulation through topographic form drag, turbulence and mixing. The interaction of large-scale, low-frequency geostrophic currents with steep topography produces a rich submesoscale and mesoscale vorticity field that initiates a cascade of energy down to small scales and turbulence. Over more gentle topography, lee waves arise and may break nearby or propagate and eventually break elsewhere, leading to local and remote turbulence and mixing. Together, wakes and lee waves significantly impact the topographic form drag and play an important role in energy and momentum budgets of the low-frequency flow. Despite extensive research on stratified flow over topography, our ability to predict and parameterize oceanic flow at spatial scales comparable to the topography is lacking. This session solicits abstracts employing modeling, observations, or theory to link basin-scale flows to topographic lee waves/wake effects, thereby advancing the state of knowledge of (a) the science of flow at topography, boundary layers, and downscaling and (b) models and forecasts of the relevant processes.

**Primary Chair:  Oliver B Fringer**, Stanford University, Department of Civil and Environmental Engineering, Stanford, CA, United States

**Co-chairs:  Ganesh Gopalakrishnan**1, **Ruth C Musgrave**2 and **Gunnar Voet**1, (1)Scripps Institution of Oceanography, La Jolla, CA, United States(2)Massachusetts Institute of Technology, Department of Mechanical Engineering, Cambridge, MA, United States

## [PO006. Understanding the differing roles of ocean ventilation and mixing on heat and carbon uptake](https://agu.confex.com/agu/os18/preliminaryview.cgi/Session28523)

**Session ID#:**28523

##### Session Description:

Ocean uptake of both heat and carbon play a key role in modulating the natural earth system response to anthropogenic CO2emissions. Both heat and carbon are diffused across the air-sea boundary, but their behavior is different in the ocean interior. Heat can be thought of as an “active tracer” and changes in temperature and associated gradients have direct feedbacks on ocean circulation. Carbon, however, can be thought of more as a “passive tracer” as its physical impacts are often integrated through biogeochemical processes. Ocean ventilation and diapycnal mixing play a key role in redistributing heat and carbon throughout the global ocean and have potentially different impacts on heat and carbon.

This session aims to highlight the sensitivity of heat and carbon uptake to varying mixing processes in ocean models. We seek submissions spanning a wide range of processes and temporal scales - from seasonal to millennial scale. Works focusing on applications of heat and carbon uptake related to climate sensitivity -- e.g. the Transient Climate Response to cumulative carbon Emissions (TCRE) -- are also encouraged.

**Primary Chair:  John P Krasting**, NOAA / Geophysical Fluid Dynamics Laboratory, Princeton, NJ, United States

**Co-chairs:  Michael Winton**, Geophysical Fluid Dynamics Laboratory, Princeton, NJ, United States; NOAA / Geophysical Fluid Dynamics Laboratory, Princeton, NJ, United States, **Ric Williams**, Liverpool University, School of Environmental Sciences, Liverpool, United Kingdom and **Kirsten Zickfeld**, Simon Fraser University, Department of Geography, Burnaby, BC, Canada

# Regional Studies

## [RS002. Ocean circulation and air-sea interaction in the Bay of Bengal](https://agu.confex.com/agu/os18/preliminaryview.cgi/Session23891)

**Session ID#:**23891

##### Session Description:

The Bay of Bengal is a unique semi-enclosed tropical ocean basin forced by and coupled with the summer/winter South Asian Monsoons and fresh water inputs from some of the largest rivers in the world. This session aims to bring investigators together to characterize the Bay of Bengal ocean circulation at a range of spatial and time scales. Scales of interest are: spatial scales spanning basin-scale circulation to fine-scale dynamics (fronts, mixing) and time scales from diurnal, intra-seasonal, seasonal, inter-annual to decadal. Using observations, modeling, and theory, we aim to synthesize our understanding the ocean’s role in air-sea interactions and the Monsoons. Topics of interest include upper ocean processes, air-sea interaction, boundary currents, freshwater dispersal, and mixing in the Bay of Bengal and exchange with the Arabian Sea. We encourage presentations that characterize the upper ocean structure and identify key processes that set the lateral and vertical temperature-salinity distribution over a range of length and time scales. Processes that influence bio-optical and biogeochemical property distributions are also of interest. We welcome studies that focus on the coupling of the atmosphere and ocean, e.g., tropical instabilities, intra-seasonal oscillations, as well as those that detail factors controlling sea surface temperature and air-sea fluxes.

**Primary Chair:  Amit Tandon**, University of Massachusetts, Dartmouth, MA, United States

**Co-chairs:  P N Vinayachandran**, Indian Institute of Science Bangalore, India, **Manikandan Mathur**, Indian Institute of Technology Madras, Aerospace Engineering, Chennai, India and **Hemantha W Wijesekera**, US Naval Research Laboratory, Stennis Space Center, MS, United States

## [RS003. Physical, Chemical and Ecological Environment of Deep Marginal Seas](https://agu.confex.com/agu/os18/preliminaryview.cgi/Session28506)

**Session ID#:**28506

##### Session Description:

Oceanographic studies of marginal seas have typically focused on shallow basins or the upper water column.  Deep marginal seas, semi-enclosed basins with depths below a permanent thermocline, have unique physical, chemical and ecological traits that set them apart from shallower counterparts. Some are particularly energetic environments, impacted by branches of western boundary currents or containing their own wind-driven gyres.  Upper ocean currents and eddies can serve as mechanisms for transferring energy to the deep layer where topographic interactions can become important.  The deep circulation plays an important role in connecting benthic communities and transporting chemical constituents, e.g., hydrocarbons from seeps and drilling activity, throughout the marginal sea basins.  Within seas with shallow connecting passages to the open ocean, bioconnectivity is restricted and deepwater organisms may evolve to be distinct from their open ocean counterparts. A number of observational and modeling studies of the deep environment and transport in marginal seas have been conducted recently due to their strategic importance and increase in deepwater oil and gas exploration.  This session provides an opportunity for the research community to share results of recent physical oceanographic, ecological, and biochemical studies of deep marginal seas, highlighting unique traits and similarities shared between these environments.

**Primary Chair:  Steven L Morey**, Florida State Univ, Tallahassee, FL, United States

**Co-chairs:  Dmitry S Dukhovskoy**, Florida State University, Tallahassee, FL, United States, **Amy S Bower**, WHOI, Woods Hole, MA, United States and **Joao Marcos Souza**, Centro de Investigación Científica y de Educación Superior de Ensenada, San Diego, CA, United States

## [RS006. The Regional Ocean Circulation, Water Exchanges and related Studies in the South China Sea](https://agu.confex.com/agu/os18/preliminaryview.cgi/Session27777)

**Session ID#:**27777

##### Session Description:

The South China Sea (SCS) is situated in the tropical northwestern Pacific, and its wind climate is dominated by the monsoon system. Thus the monsoon forcing is significantly reflected in the multi-timescale variations of the SCS circulation. The SCS western boundary current (hereafter SCSwbc) is a major part of the SCS circulation and SCS throughflow (one of important branches connecting the Pacific and Indian Oceans), which consists of several strong branches, e.g. the SCS Warm Current and the Vietnam Coastal Current et al. Besides the local wind forcing, the water exchanges through the Luzon Strait, especially the Kuroshio intrusion into the SCS also have important contributions to the SCSwbc. However, due to the limited observation and model resolution, the SCSwbc structure, variability and dynamic processes are yet to be well understood. In this session, studies on but not limited to the regional ocean circulations (SCS throughflow, monsoonal ocean circulations), eddy-SCSwbc interactions, cross-continental shelf exchanges, ocean heat/salt transports, as well as relevant biogeochemical processes are welcomed.

**Primary Chair:  Dongxiao Wang**, SCSIO South China Sea Institute of Oceanology, Chinese Academy of Sciences, Guangzhou, China; South China Sea Institute of Oceanology (SCSIO), Chinese Academy of Sciences, Guangzhou, China

**Co-chairs:  Arnold L Gordon**, Columbia University of New York, Lamont-Doherty Earth Observatory, Palisades, NY, United States, **Paola M Rizzoli**, MIT, Cambridge, MA, United States and **Jun Wei**, Department of Atmospheric and Oceanic Sciences, School of Physics, Peking University, Beijing, 100871, P.R.China

# Tutorials

## [T005. Oceanography from space for everyone:  Demystifying satellite data for researchers and end-users](https://agu.confex.com/agu/os18/preliminaryview.cgi/Session28630)

**Session ID#:**28630

##### Session Description:

Observations of surface ocean properties by satellite remote sensing are essential components for scientific investigations, modeling and data assimilation activities, and operational applications that assess, monitor and predict the physical, biological, and biogeochemical states of the marine ecosystem.  For the open ocean, many key environmental parameters are determined on a routine and sustained basis from well-validated algorithms including sea surface temperature, sea surface height, ocean color, sea ice, ocean winds, and roughness of the ocean surface (e.g., oil spills), providing frequent and synoptic coverage.  Retrievals in coastal and near-shore waters continue to be an area of active research and development, but many products are ready for use in research and science-based applications.  Gaining access to and utilizing these satellite data can be daunting to the non-specialist, however.  This tutorial will: i) review current status and availability of mature, operational satellite observations for the ocean and coasts; ii) highlight methods for the discovery and acquisition of these data; iii) provide information on emerging satellite-derived products; and iv) illustrate use of these data through representative case studies.  The tutorial will conclude with a group discussion on solutions to the barriers (real or perceived) that constrain more routine utilization of these data.

**Primary Presenter:  Paul M DiGiacomo**, NOAA College Park, College Park, MD, United States

## [T006. Ocean Remote With Global Navigation Satellite System Reflectometry (GNSS-R)](https://agu.confex.com/agu/os18/preliminaryview.cgi/Session28625)

**Session ID#:**28625

##### Session Description:

Reflectometry is a new method of ocean remote sensing, utilizing scattered “signals of opportunity” from the Global Navigation Satellite System.  GNSS-R embodies some aspects of both active scatterometry and passive radiometry. New methods for retrieving ocean wind speed, sea surface height., sea surface roughness, and significant wave height have been derived for GNSS-R observations from fixed, airborne and spaceborne platforms.  With the recent launch of the 8-satellite CYGNSS (Cyclone GNSS) constellation, GNSS-R data will be widely available for ocean remote sensing in the tropics.  This tutorial will review the fundamental principles of GNSS-R, including forward models, observables and inverse methods.  A review of current applications of GNSS-R to ocean science and applications will be provided

**Primary Presenter:  James L Garrison**, Purdue University, School of Aeronautics and Astronautics, West Lafayette, IN, United States

## [T008. [Overturning the ocean circulation](https://agu.confex.com/agu/os18/preliminaryview.cgi/Session28676)

**Session ID#:**28676

##### Session Description:

It has been established over the past few decades that deep-ocean turbulence plays a leading role in maintaining the oceanic meridional overturning circulation (MOC), which shapes the ocean's capacity in the redistribution, storage and ventilation of physical and biological tracers. Recent progress in computational resources has shed light on this topic by allowing for the resolution of finer turbulence in regional ocean models, as well as by making direct and large eddy simulations of such turbulent processes possible over ocean-relevant parameter ranges.  These new advances have also energized theoretical studies of turbulence and its impact on the MOC. Most importantly, accumulation of evidence from a handful of major field programs has motivated and informed all of the above. In this tutorial we briefly review the above-mentioned observational, theoretical and computational advances, and discuss their implications for the MOC and the climate system. It increasingly seems that small-scale turbulence not only facilitates ventilation of the deep and abyssal oceans (a millennial-scale phenomena), but is relevant on time scales as short as decadal through short-circuiting of information between the lower and upper oceans at turbulent hotspots around rough topographic features, continental margins and in the Southern Ocean.

**Primary Presenter:  Ali Mashayek**, Scripps Institution of Oceanography, La Jolla, CA, United States

**Presenter:  Alberto Naveira Garabato**, University of Southampton, Ocean and Earth Sciences, Southampton, SO14, United Kingdom

## [T009. Seismic Oceanography: What can active-source seismic reflection profiling tell us about the oceanic water column?](https://agu.confex.com/agu/os18/preliminaryview.cgi/Session27826)

**Session ID#:**27826

##### Session Description:

It has relatively recently been recognised that variations in temperature and salinity within the oceanic water column give rise to acoustic impedance contrasts which can be imaged using active-source seismic reflection profiling. Seismic images of thermohaline structure achieve spatial resolutions of ~O(10) m in both the horizontal and the vertical, sample the full depth of the water column along transects of hundreds of kilometers in length, and capture physical oceanographic phenomena at a wide range of scales. Techniques for quantifying geostrophic velocities, absolute values of temperature and salinity, and rates of turbulent mixing using seismic data have been developed. Recently, seismic transects in which data is acquired in both horizontal dimensions have been acquired repeatedly. Using these data, the development of three-dimensional thermohaline structure on spatial scales of O(100) m to O(100) km and on time scales of days to years can be mapped. Such maps relate the spatio-temporal evolution of mesoscale features and the internal wave field to turbulent dissipation at small scales. This tutorial will provide (I) an overview of the seismic technique; (II) a summary of some previous results; and (III) a discussion of objectives for future development and broader application of the method.

**Primary Presenter:  Colm-cille Patrick Caulfield**, University of Cambridge, BP Institute/Department of Applied Mathematics and Theoretical Physics, Cambridge, United Kingdom

**Presenter:  Katy L. Sheen**, University of Exeter, Geography, Exeter, United Kingdom

Town Hall

## [Deep Ocean Observing Strategy (DOOS) Town Hall](https://agu.confex.com/agu/os18/preliminaryview.cgi/Session29970)

**Session ID#:**29970

##### Session Description:

The Deep Ocean Observing Strategy (DOOS), in close cooperation with the Global Ocean Observing System (GOOS), is galvanizing experts to develop a strategy for sustained, global, deep ocean observations across disciplines. DOOS considers essential ocean variables, key geographic regions, readiness for implementation and emerging technologies that will provide a blueprint for deep-sea observing over the coming decades. The strategy will provide a framework for comprehensively observing, monitoring, and forecasting conditions of the deep ocean. This town hall is an opportunity to inform and obtain input from the science community as DOOS begins to prepare a Science and Implementation Guide.

**Primary Contact:  Lisa A Levin**, University of California San Diego, Scripps Institution of Oceanography, La Jolla, CA, United States

**Presenters:  Lisa A Levin**, University of California San Diego, Scripps Institution of Oceanography, La Jolla, CA, United States, **Patrick Heimbach**, University of Texas at Austin, Austin, TX, United States and **Henry Ruhl**, National Oceanography Centre, Southampton, United Kingdom