2026 Ocean Salinity Science and Technology Meeting Report

Severine Fournier[1], Tony Lee[1], Peter Gaube[2],
and other members of the scientific organizing committee[3]

[1] Jet Propulsion Laboratory, California Institute of Technology, Pasadena, CA, USA; severine.fournier@jpl.nasa.gov

[2] Applied Physics Laboratory, University of Washington, Seattle, WA, USA (local host)

[3] List of members available at https://salinity.oceansciences.org/2026Meeting_Overview_committee.htm

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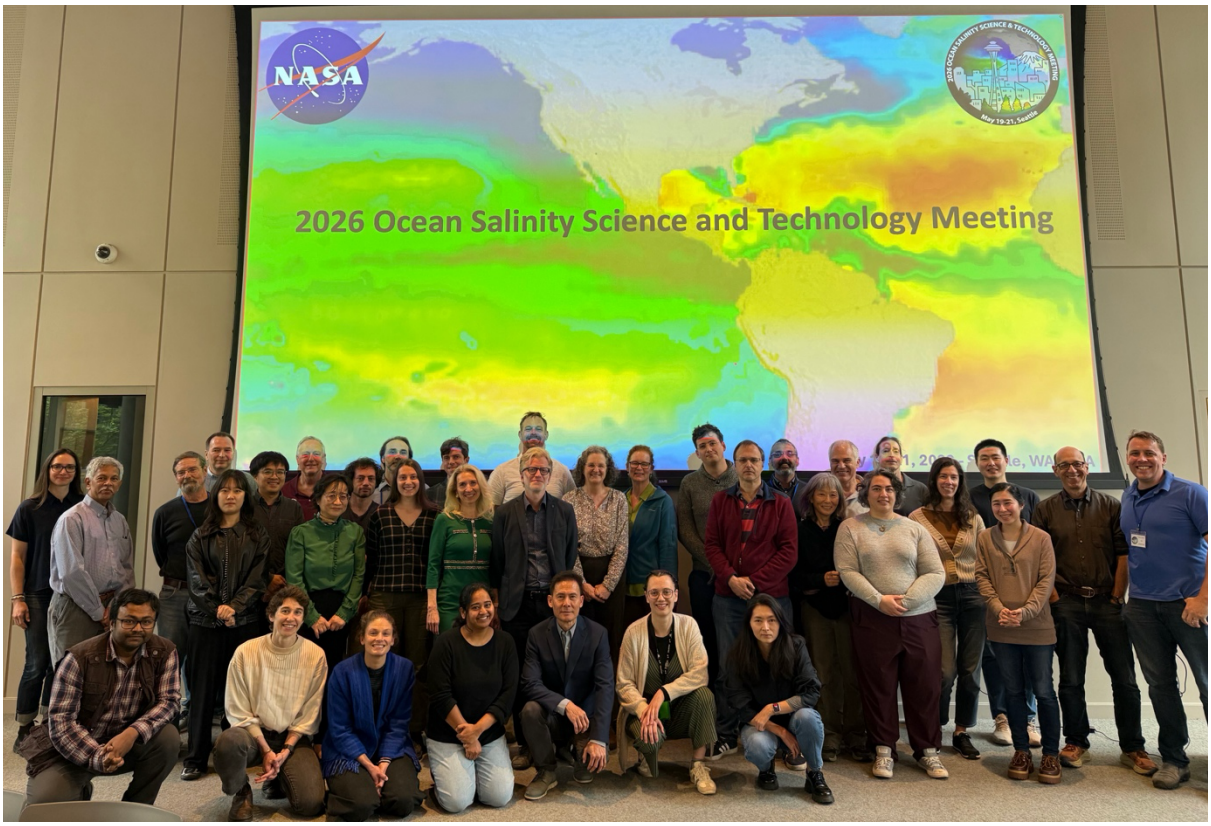

Summary

Ocean salinity plays critical roles in ocean circulation, ocean–atmosphere exchanges, land–sea interaction, marine biology and biogeochemistry, and in sea-ice formation and melting. Through these roles, ocean salinity affects the Earth's hydrosphere, atmosphere, biosphere, and cryosphere, demonstrating its strong societal relevance. Sea surface salinity (SSS) and subsurface salinity have been identified as Essential Climate Variables by the Global Climate Observing System (GCOS) and as Essential Ocean Variables by the Global Ocean Observing System (GOOS). Significant progress has been made in the past two decades in observing global ocean salinity using satellites along with in-situ instruments, and the resulting observations have enhanced our understanding of the role of ocean salinity in the Earth's system, in particular of ocean circulation, climate variability, the water cycle, biogeochemistry and forecasting.

A regular international meeting series focusing on ocean salinity observations and science has helped foster the rapidly growing applications of salinity data. The series started in 2013 in Brest, France with a workshop focused on the achievements of the two L-band satellite missions then measuring SSS from space: the Soil Moisture and Ocean Salinity (SMOS) Mission by the European Space Agency (ESA), and the Aquarius/SAC-D Mission by NASA and the Argentine space agency CONAE. Subsequent meetings occurred in Exeter (UK, 2014), Hamburg (Germany, 2015), Falmouth (USA, 2017), Paris (France, 2018), New York City (USA, 2022), and Noordwijk (the Netherlands, 2024).

The 2026 Ocean Salinity Science and Technology Meeting (https://salinity.oceansciences.org/2026Meeting_Overview.htm) convened 19–21 May 2026 at the Applied Physics Laboratory, University of Washington, Seattle, WA, USA. The meeting was held primarily in person, with limited options for remote participation. It was attended by approximately 50 international researchers, about 35 in person and 15 online, and featured 45+ oral presentations and about 15 posters. The main goal of the meeting was to identify critical drivers for ocean salinity science, applications, and salinity measurement needs for the coming decade, with three organizing themes:

- The kickoff of NASA's FRESH (Fate of River Export and Surface Hydrology) Arctic field campaign and other field activities planned for Summer 2027;
- Critical drivers for ocean salinity science and applications and the future need for high-resolution technologies; and
- Recent ocean salinity science advances.

The meeting featured six different sessions that are detailed below, focusing on (1) the NASA's FRESH Arctic campaign focused on the Colville River system and the Beaufort Sea, and adjacent Arctic field activities also planned for Summer 2027; (2) Arctic processes; (3) Mission, sensors, and retrievals; (4) Open Ocean Processes; (5) Salinity products and Cal/Val; (6) Coastal Ocean processes and biogeochemistry. The meeting also featured wide-ranging discussion of priorities for the coming decade. The next Ocean Salinity Conference is expected to take place in Europe in 2028.

Sessions

The 2026 meeting was organized around three full days of plenary sessions plus a dedicated poster session. The program consisted of the following sessions:

Opening. Status of the NASA and ESA salinity programmatic and scientific activities; the NASA Salinity website and Salinity StoryMaps outreach platform; and a keynote presentation by Lisan Yu on the multiple roles of ocean salinity across space–time scales, from a water-cycle indicator at planetary scales to a dynamical driver of ocean density at the scale of O(10 km).

Summer 2027 in the Arctic. Kickoff presentation for FRESH Arctic and presentations of other Arctic field campaigns that will also occur in summer 2027: the FORTE Earth Venture Suborbital mission, and the Beau PAIR Polarstern expedition, among which some coordination will be planned.

Arctic Processes. 12 oral presentations and 3 posters covering Pacific water inflow through the Bering Strait and its imprint on the Chukchi Sea salt pool; satellite-derived salinity and density fluxes in the Nordic Seas as part of the Arctic-FLOW project; machine-learning reconstruction of Barents Sea freshwater content as part of the ARCFRESH project; the role of surface salinity in upper-ocean stratification and sea-ice formation; microSWIFT and ALTO/ALAMO float observations in the Beaufort Sea; network-based modeling and lake-connectivity analysis of Arctic deltas; continuous flow-through isotope tracing of Arctic freshwater sources; drifting and moored observations of coastal Arctic plumes; the Mackenzie River plume effect on Beaufort autumn freeze-up; the new llc4320v2 high-resolution ocean–ice–river–tides simulation; the SASSIE ECCO high-resolution Arctic state estimate; (sub)mesoscale uCTD observations from SASSIE; and improving global river discharge from satellites.

Open Ocean Processes. 9 oral presentations and 1 poster on the role of large-scale seasonal-cycle advection in maintaining the mean ocean salinity distribution; thermohaline signatures of Gulf Stream warm- and cold-core rings from 15 years of L-band radiometry; SSS signatures preceding the Pineapple Express atmospheric river; the stability of the Atlantic Meridional Overturning Circulation (AMOC) under continued warming; comparisons of salinity and temperature budgets in the upper ocean from a high-resolution model; coupled salinity–temperature extremes and stratification during marine heatwaves in the Northwest Atlantic; the impact of satellite SSS assimilation on stratification and thermal variability in NASA GEOS-S2S v2; salinity-induced eastward flow in boreal spring favoring extreme El Niño events; attribution of central-equatorial Pacific freshening during El Niño to wind stress versus E–P; and ECCO-based attribution of Southeast Indian Ocean decadal salinity variability to Maritime Continent freshwater forcing.

Coastal Ocean Processes and Biogeochemistry. 6 oral presentations and 2 posters on the role of salinity in ocean carbon-cycle and ocean acidification assessments and climate policy; characterization of Bering Sea salinity variability from satellite, Argo, and a 2-km coupled ice–ocean model; characterization of surface salinity variability in the Gulf of Mexico using a regional ocean-model ensemble; the radiative-trap mechanism by which optically rich river water modulates equatorial ocean heat uptake; coastal salinity as a proxy for natural and human hydrological-cycle change; seasonal and interannual variability of SSS along the US West Coast and its implications for operational forecast assimilation; SSS variability in the Gulf of Anadyr; and shelf-interior ocean transport along the US West Coast.

Mission, Sensors, and Retrievals. 7 oral presentations and 2 posters on the status and SSS-retrieval performance of the ESA CIMR mission (continuity); the science case and end-to-end simulator for the ESA CryoRad wideband mission concept; the FReSCH 10-km L-band mission concept; new concepts for high-resolution L-band sensing (including SALTY and TriHex interferometric architectures); the first year of in-

orbit performance of MICAP onboard the Chinese Ocean Salinity Mission satellite; near-surface, airborne, and spaceborne high-resolution and polar salinity remote-sensing solutions; SMAP L-band ocean-surface emissivity model updates; SMAP's decadal view of L-band ocean-surface emissivity; and the absolute-salinity interferometer concept for refractive-index-based salinity measurements.

Salinity Products and Cal/Val. 7 oral presentations and 6 posters on near-real-time processing of underway salinity data from ships of opportunity; physics-informed variational gridding of multi-tracer satellite observations (VarDyn); progress toward CCI+SSS v6 with improved RFI, solar contamination, diurnal SST, and sea-ice corrections; updates to the multi-mission Optimum Interpolation SSS analysis (OISSS v3.0); the new CCI Ocean Surface Heat Flux (CCI-OSHF) Climate Data Record; detection and flagging of radio-frequency interference in SMAP ocean observations; a perspective on Fiduciary Reference Measurements, sub-footprint variability, and beyond-matchup quality assessment using forecast skill; characterization of SMAP biases and errors via SVDS and triple collocation; AI-driven global coastal SSS retrieval from ocean color; the ESA-NASA Pi-MEP platform; novel CATDS global and Arctic products; the C3S Sea Surface Salinity Climate Data Record; and the BEC Arctic v4 and SO-FRESH polar products.

Selected highlights of conference presentations

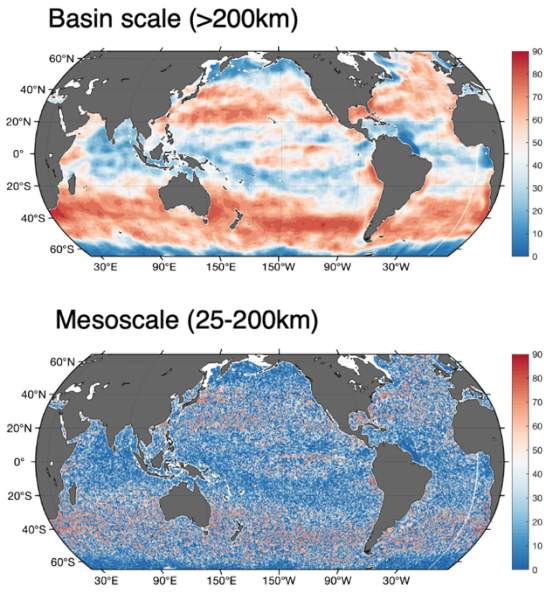

Figure 1: Turner angle at basin (top) and mesoscale (bottom). Red shows regions where density gradients are driven by temperature and blue by salinity. As scales decreases, salinity's contribution to density gradients becomes increasingly important. From Yu et al.

A major highlight of the meeting was the large diversity of scientific studies and operational applications presented, demonstrating the continuing maturation and broadening application of space-based salinity observations (SMOS, SMAP) alongside in-situ observations. With more than 15 years of multi-mission satellite SSS observations now available, the meeting featured several decadal-scale science applications that were not feasible previously.

Salinity was shown to be an active driver of the upper ocean, not just a passive tracer of the water cycle. The opening keynote (Yu et al.) argued that at fine spatial scales, salinity rivals temperature in controlling density structure, particularly through density-compensated thermohaline fronts that could be invisible to altimetry but resolvable in principle by O(10 km) SSS sensing (Figure 1). This dynamical framing motivated multiple presentations on high-resolution sensing concepts.

A coordinated set of Arctic field activities for Summer 2027 was a feature of the meeting. The NASA FRESH Arctic campaign (Rowley et al.) focuses on the Colville River system in northern Alaska, instrumented with shipboard surveys, seafloor moorings, drifting Lagrangian arrays, autonomous platforms, and airborne DopplerScatt observations. The NASA Earth Venture Suborbital mission FORTE (Tzortziou et al.) focuses on the four largest North Slope river systems and addresses the response of nearshore Arctic ecosystems to changing land–ocean fluxes. The Canadian-German Beau PAIR expedition (Mollenhauer et al.) aboard R/V Polarstern will deliver two complementary ~51-day legs in the Mackenzie–Beaufort Sea transect, co-developed with Inuvialuit communities.

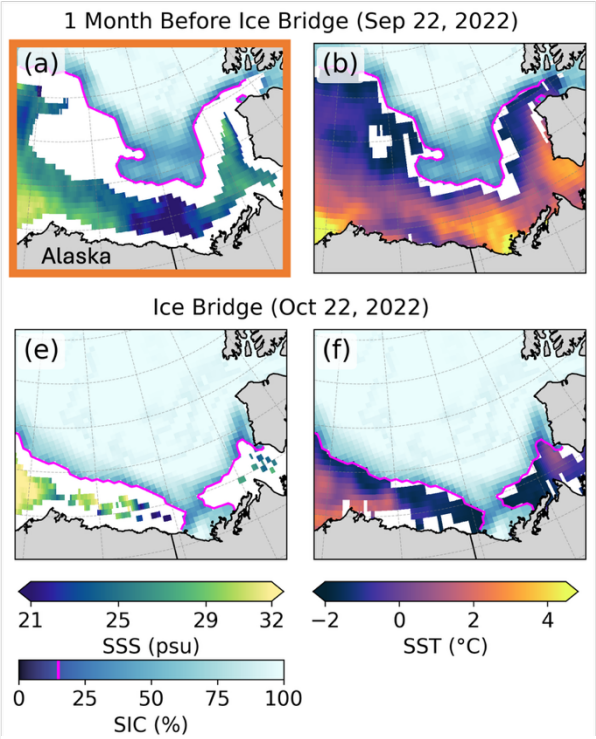

Figure 2: Maps of sea surface salinity, temperature, ice concentration from satellites on September 22 and October 22, 2022. An "ice bridge" forms from the coastline to offshore ice edge within the Mackenzie River plume (low SSS and high SST anomalies) that reach freezing point faster than adjacent waters. From Zahn et al.

Arctic process studies presented at the meeting highlighted the central role of salinity in setting upper-ocean stratification and sea-ice formation. Modeling and observational evidence (Zahn et al.) showed that the Mackenzie River plume freezes approximately three weeks earlier than adjacent saltier waters in autumn, with stratification (rather than freezing-point depression) acting as the

dominant mechanism (Figure 2). Field results from the SASSIE campaign (2022) and subsequent analyses (Gaube et al.; Bingham et al.; Steele et al.) confirmed that surface salinity controls upper-ocean density in the Beaufort Sea, with implications for sea-ice forecasts that could be improved by incorporating SSS observations. Continuous flow-through isotope measurements (Kopec et al.) enabled, for the first time, partitioning of distinct freshwater inputs (Mackenzie, Yukon, local precipitation, glacial meltwater). Network-based modeling of pan-Arctic deltas (Piliouras et al.), combined with new methods for satellite-derived lake connectivity (Dolan et al.), provides a quantitative framework for understanding how Arctic deltas modulate land-to-ocean fluxes. Other Arctic-process talks addressed the Chukchi Sea salt pool and Bering Strait inflow (Grodsky et al.), Nordic Seas salinity and density fluxes (Bergas-Ques et al.), Barents Sea freshwater-content reconstruction (Liu et al.), coastal Arctic plume observations (Thomson et al.), and the new high-resolution llc4320v2 ocean–ice–river–tides simulation (Menemenlis et al.).

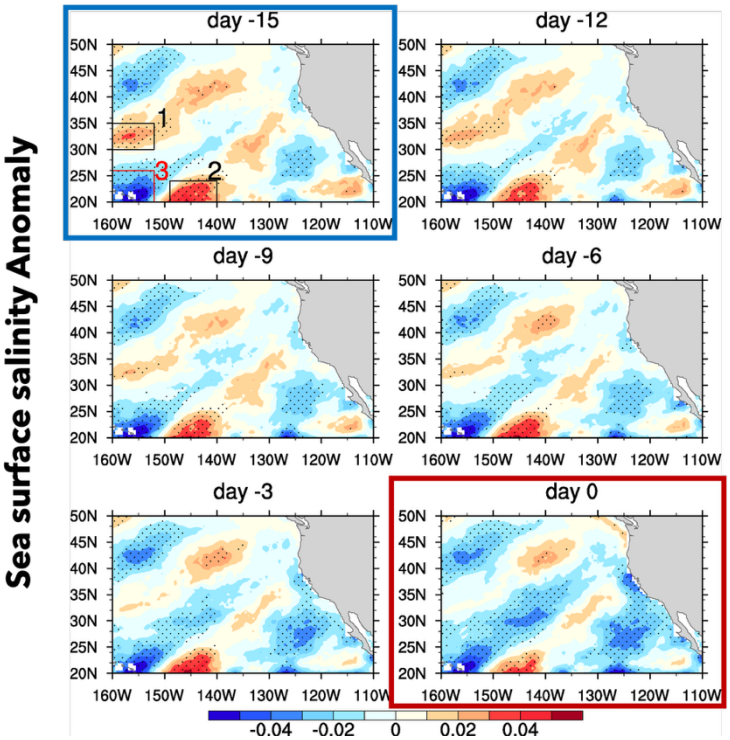

Figure 3: Sea surface salinity anomalies days before the occurrence of an atmospheric river within the Pineapple express. It shows positive (red) SSS anomalies on both sides of the Pineapple Express, associated with increased evaporation minus precipitation 2 weeks prior. From Li et al.

Recent open-ocean process studies demonstrated the value of long satellite SSS records. Salinity was shown to be a useful precursor for atmospheric rivers (Li et al.), in particular the Pineapple Express affecting the US West Coast, at lead times of two weeks, with potential for improving sub-seasonal precipitation forecasts. Coupled-model experiments (Hu et al.) suggested that spring-season salinity-induced surface zonal currents in the western equatorial Pacific can substantially increase the probability of extreme El Niño events, and that observed late-spring 2026 salinity anomalies may already be influencing this year's ENSO state. Attribution analyses based on ECCO sensitivity experiments (Lee et al.) quantified the relative importance of wind stress versus surface freshwater flux in driving central-equatorial Pacific freshening during different El Niño types. New work (Jarugula et al.) also demonstrated that decadal variability of upper-ocean salinity in the Southeast Indian Ocean is driven primarily by Maritime Continent freshwater forcing rather than by local or remote winds. Salinity assimilation experiments in the NASA GEOS-S2S coupled prediction system (Subramanian et al.) showed measurable improvements in seasonal ocean-heat-content variability and in the representation of subsurface anomalies during the 2014–2016 Northeast Pacific marine heatwave. Additional talks addressed the role of large-scale seasonal-cycle advection in the mean salinity distribution (Hochet et al.), thermohaline signatures of Gulf Stream rings from 15 years of L-band radiometry (Reul et al.), salinity and temperature budgets in a high-resolution model (Small et al.),

coupled salinity–temperature extremes during Northwest Atlantic marine heatwaves (Bulusu et al.), and a critique of proposed AMOC tipping points under continued warming (Schmitt et al.).

The meeting featured ocean carbon-cycle and biogeochemistry applications. Salinity was shown to be critical for ocean carbon and acidification assessments (Shutler et al.) and is now integrated into the Planetary Health Check 2026, the IPCC AR7 draft, the annual Global Carbon Budget, and the UNESCO Roadmap of Ocean Carbon Research 2026. Satellite-derived ocean carbon constraints from salinity-informed retrievals also influence the global land-sink estimate. New analyses (Jarugula et al.) hinted at a potential link between changes in coastal SSS to land-use change, with some evidence that Amazon deforestation is freshening the coastal tropical Atlantic at approximately 0.35–0.45 psu/year in May. The talk on river-water optics in the equatorial ocean (Chaudhuri et al.) identified a previously unrecognized "radiative trap" mechanism in which optically rich river water absorbs more solar radiation and accelerates surface warming, evident in the Bay of Bengal, the Amazon-Orinoco system, and the Congo plume. Regional coastal studies addressed Bering Sea salinity variability (Durski et al.), Gulf of Mexico plume variability (Thouvenin-Masson et al.), and US West Coast SSS and its assimilation into operational forecasts (Kurapov et al.).

On the technology side, the meeting reviewed the status of the ESA CIMR mission (Reul et al.; CIMR-A planned for 2029 launch, CIMR-B sequential, with continuity to 2045+), the SMOS extension through end of 2028, and the first year of in-orbit performance of the Chinese Ocean Salinity Mission's MICAP instrument (Liu Hao et al.). Two ESA Earth Explorer 12 candidate missions targeting different gaps were presented: CryoRad (Boutin et al.; Gonzalez-Gambau et al.), a wideband 0.4–2 GHz radiometry mission currently in Phase 0 (with a decision to potentially go to Phase A/B1 expected at the User Consultation Meeting in July 2026), aiming for substantially improved sensitivity to SSS in cold polar waters, sea-ice

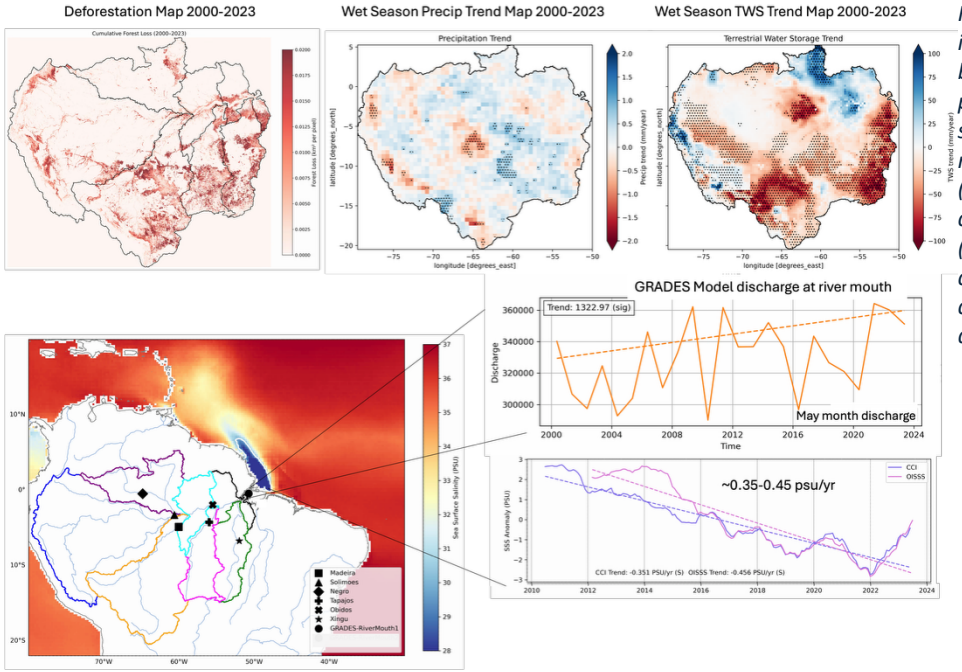

Figure 4: While deforestation is increasing in the Amazon River basin (top left) and precipitation not exhibiting a significant trend (top middle), more freshwater is being stored (top right) and the adjacent coastal ocean is freshening (bottom), linking land use changes and impacts on the coastal ocean. From Jarugula et al.

thickness, and ice-sheet temperature profiles; and FReSCH (Rodriguez-Fernandez et al.), a commended 10-km L-band mission concept designed to resolve coastal plumes, submesoscale circulation, and surface pCO_2. On the NASA side, the SALTY high-resolution L-band concept was also presented (Akins et al.; Misra et al.), alongside CIMR PLUS and Goddard's GLOWS concept. An absolute-salinity interferometer based on refractive-index measurement was also presented (Schmitt et al.). The

talks collectively explored the trade space between resolution and accuracy, the role of multi-frequency synergy, and the increasing constraint imposed by radio-frequency interference.

Several presentations advanced the maturity of multi-mission and gridded SSS products. The Climate Change Initiative product CCI+SSS v5 (Bonjean et al.; 2010–2023, delivered in 2025) achieved a global precision (STDD) of approximately 0.14 pss against gridded reference data; v6 (2010–2024, planned for mid-2026) incorporates SMOS L2OS reprocessing, an SST diurnal-cycle correction, a solar-activity correction, a refined sea-ice-edge correction, and updated RSS SMAP v6.0/v6.3 inputs. The Optimum Interpolation SSS analysis (Melnichenko et al.; OISSS v3.0) incorporates full-resolution SMOS data throughout the record, improved bias-correction algorithms for SMOS calibrated against SMAP, a finer 4-day OI cycle, and new spatial-temporal signal and error statistics, achieving a global mean RMSD of 0.22 psu against Argo. The BEC Arctic v4 polar product and the Southern Ocean SO-FRESH product (González-Gambau et al.; Olmedo et al.) demonstrated substantially improved retrieval performance near the ice edge, and the upcoming ESA CCI Ocean Surface Heat Flux Climate Data Record (Olmedo et al.) uses salinity as a core input. The new Copernicus Climate Change Service (C3S) SSS product (Parc et al.) is planned for delivery in late 2026 / early 2027 with formal climate-monitoring standards. A physics-informed variational gridding approach to infer salinity at high-res (Le Guillou et al.) and near-real-time underway-salinity processing from ships of opportunity (Alory et al.) were also presented.

Validation activities continue to push toward more rigorous accounting of representation errors. The ESA-NASA Pi-MEP platform (Guimbard et al.) now hosts 155 satellite SSS products, 25 in-situ datasets, and ~30,000 systematic validation reports, with new representation-error estimates derived from very-high-resolution ECCO and Glorys models. The Salinity Validation Data System (Anderson et al.) provides triple-collocation analyses across SMAP, SMOS, and EN4 in-situ products, and dedicated work on detection and flagging of radio-frequency interference in SMAP ocean observations (Meissner et al.) was presented. Novel global and Arctic products from the CATDS center (Boutin et al.) and an AI-driven coastal SSS retrieval from ocean color (Kim et al.) were also featured. Underway thermosalinograph processing from commercial ships of opportunity (Alory et al.) has been adapted to near-real time using colocated Argo data for correction, reducing RMSD between near-real-time and delayed-time products by a factor of 3 to 4. The community discussion identified the Fiduciary Reference Measurement framework (Schanze et al.) as the appropriate organizing principle for future Cal/Val efforts and emphasized the need for skin-salinity observations and characterization of representation errors at multiple scales.

Education and outreach were highlighted via the NASA Salinity website (deCharon et al.; https://salinity.oceansciences.org/), which now hosts 25 published Salinity Stories with approximately 119,000 cumulative views and an upcoming AI assistant trained exclusively on NASA Salinity content. Several recent project results, including SASSIE, FRESH Arctic, and the recent salinity–marine heatwave studies, have been translated into Salinity Stories aimed at non-specialist audiences.

Discussion points

Several discussion points were explored in discussion sessions held at the end of each session. The points below summarize the main threads of those discussions.

Continuity and enhancement of satellite SSS observations. Discussion highlighted the continuity of the L-band satellite SSS record as a community priority and a prerequisite for climate monitoring. The ESA CIMR-A mission (planned launch 2029) is expected to provide continuity for SMOS and SMAP and to leverage simultaneous multi-frequency passive-microwave measurements of winds and SST. Beyond continuity, participants discussed the desire to enhance spatial resolution, improve availability of measurements close to the coast, and improve cold-water accuracy. In particular, high-resolution (~10-km) SSS adds the missing the freshwater–buoyancy dimension in understanding small-scale ocean dynamics, linking frontal dynamics to biological productivity, carbon cycling, and Earth system model fidelity, and complementing existing high-resolution satellite measurements of the ocean (e.g., from SWOT and PACE).

On the trade-off between resolution and accuracy, it was noted that for Arctic Ocean applications higher resolution closer to land and ice edges may be more valuable than further accuracy improvements at coarser resolution, while in the Southern Ocean the lower amplitude of signals could invert this preference.

Protecting the L-band radio-frequency allocation. Maps of radio-frequency interference (RFI) over time show that RFI in the protected L-band has been increasing rapidly, particularly since late 2024, with geopolitical conflicts identified as principal causes. Discussion converged on several possible actions raised by participants: engaging with the spectrum-management community through AGU, IGARSS, and AMS spectrum meetings; coordinating with the radio-astronomy community, which has substantially greater resources to defend protected frequency allocations; and explicitly including the preservation of the protected L-band as an objective per-se in future mission proposals. Participants also discussed using the term "RFI filtering" rather than "RFI mitigation" in mission documentation, to avoid signaling that the problem can be managed on the retrieval team’s end. Improved on-board and ground RFI detection and filtering was discussed as a critical area for future mission design.

Sustaining and enhancing the in-situ salinity observing system. Discussion emphasized that Argo and the broader in-situ network are essential for monitoring three-dimensional salinity, for measuring near-surface stratification, and for satellite Cal/Val. Participants noted that the community is in a "golden age" of in-situ observations, but that funding cuts can be a potential threat. The microSWIFT program was cited as one viable model for cost-effective expanded coverage in the Arctic Ocean. Continued development of skin-surface salinity measurements was discussed as important for satellite Cal/Val, given that satellites really sense the uppermost ocean layer. Participants also discussed the continued value of the tropical observing system (notably TAO/TRITON) for ENSO forecasting and satellite SSS validation.

The Fiduciary Reference Measurement framework. Discussion explored the Fiduciary Reference Measurement (FRM) concept (i.e, the qualification of a sub-set of in-situ measurements adhering to strict protocols for data acquisition, standards and uncertainty characterization) as an organizing principle for future SSS Cal/Val efforts. Participants noted that validation in-situ data should be independent of the satellite algorithms they validate, that in Europe salinity is next in line for classification of FRM-qualifying observations, and that citizen-science measurements would more likely be considered for data augmentation rather than FRMs. Sustaining skin-salinity measurements and characterizing representation errors (vertical, horizontal, and temporal) were discussed as core elements of the FRM concept.

Salinity field campaigns for process understanding and mission support. The coordinated Summer 2027 Arctic field activities: FRESH Arctic, FORTE, and Beau PAIR, were discussed as together representing the most ambitious salinity-focused field campaign cluster since SPURS-2. Participants discussed the value of continued process-oriented field campaigns to support future mission concepts (CIMR, CryoRad, FReSCH, SALTY) and to address persistent questions about near-surface stratification, plume mixing, and air-sea exchange in poorly observed regions. The importance of designing field campaigns in close partnership with Indigenous communities and with international coordination, where appropriate, was emphasized.

The use of salinity in ocean modeling, data assimilation, and forecasting. Discussion noted that assimilation of satellite SSS continues to improve coupled prediction system performance, as demonstrated for NASA GEOS-S2S. Participants discussed the value of sensitivity experiments, analogous to the ECCO-based forcing attribution presented for equatorial Pacific freshening, for ensuring that improvements in assimilated forecasts are physically interpretable rather than empirical.

The role of salinity in Earth-system science and the upcoming Decadal Survey. With more than 15 years of multi-mission satellite SSS observations now available, participants discussed the community's position to articulate the science return of salinity in ways that were not possible at previous meetings in this series. It was discussed that salinity is not only an ocean variable but an Earth-system variable, with documented or emerging applications to ENSO forecasting, atmospheric-river prediction, sea-ice forecasting, coastal hazards, marine heatwaves, ocean carbon-cycle assessments, ocean acidification monitoring, and detection of human modifications to the global water cycle (including deforestation and land-use change). Participants discussed the value of a community-led white paper, expected to be solicited by the U.S. National Academies of Sciences, Engineering, and Medicine for the next U.S. Decadal Survey for Earth Observations from Space, framing salinity science in the integrated context of the Data, Application, Research, and Technology (DART) framework, and articulating how salinity supports broad national and international science priorities. An important aspect of such a white paper is to summarize and emphasize the published results and insights about the Earth system uniquely enabled by satellite SSS (e.g., about water cycle changes), i.e., not afforded by other elements of the Earth observing system.

A Science Traceability Matrix for high-resolution salinity sensing. With multiple high-resolution mission concepts now under study, participants discussed the value of a Science Traceability Matrix that maps specific science questions (compensated fronts, submesoscale eddies, coastal plumes, polar gradients, surface pCO_2) to specific measurement requirements (resolution, revisit time, swath, accuracy by region) and that supports observing-system simulation experiments. The role of community-led orbital simulations in demonstrating that proposed mission concepts can answer the science questions they are designed for was also discussed.

Machine-learning and AI methods for salinity science. Discussion addressed the increasing use of machine-learning and AI methods for salinity retrieval (e.g., ocean-color-based coastal SSS) and for forecasting (e.g., the NESSIE convolutional-LSTM Arctic sea-ice forecast). Participants discussed continued development of these methods while cautioning against deployment without physical understanding, and noted the value of accompanying ML applications with sensitivity and attribution experiments so that performance gains remain physically interpretable.

Communication of salinity-derived products and broadening the user community. Participants discussed how several higher level products, including SSS from ocean color retrievals, satellite-derived ocean carbon fluxes, and HR SSS using VarDyn, currently sit in a low-distribution tier despite high scientific maturity. The possibility of making these derived products available, with consistent provision, validated uncertainty estimates, and publicly available algorithms, was discussed. Continued investment in the

NASA Salinity website and Salinity Stories outreach platform, including the upcoming NASA Salinity AI Assistant, was discussed as a way to support broader uptake by non-specialist audiences.

The next Ocean Salinity Conference is expected to be held in Europe in 2028. The meeting series will continue to provide the primary forum for international coordination on ocean salinity science, technology, and applications, bringing together researchers working on observations, numerical models, data assimilation, science, and applications.

Acknowledgement

The NASA Physical Oceanography Program provided the primary sponsorship for the meeting. The Applied Physics Laboratory at the University of Washington hosted the meeting and provided logistical support. ODYSEA LLC provided meeting logistics and outreach support, including the NASA Salinity website and the conference materials. The organizing committee is grateful to all session chairs for their contributions, and to the early-career researchers who served as chairs and contributed substantively to the discussions moderation.

Conference presentations

Oral and poster presentations from the meeting will be made available through the NASA Ocean Salinity website (https://salinity.oceansciences.org/) unless authors have requested that their materials not be redistributed. The meeting program is provided below; the full agenda is also available at https://salinity.oceansciences.org/2026Meeting_Overview_programs.htm.

Agenda of the 2026 Ocean Salinity Science and Technology Meeting

The meeting was held 19–21 May 2026 at the Applied Physics Laboratory, University of Washington, Seattle, WA, USA. The full program is reproduced below; it is also available at https://salinity.oceansciences.org/2026Meeting_Overview_programs.htm. "(remote)" indicates a presentation delivered remotely.

Tuesday, 19 May 2026

Opening Session (Chair: Severine Fournier and Tony Lee)

Time	Presenter	Title
08:30–08:35	Peter Gaube (UW-APL, USA)	Welcoming remarks
08:35–08:55	Nadya Vinogradova-Shiffer (NASA, USA)	NASA program status
08:55–09:15	Roberto Sabia (ESA, Italy)	ESA program status
09:15–09:30	Annette deCharon (remote, ODYSEA, USA)	NASA Salinity website and StoryMaps
09:30–09:35	Tony Lee / Severine Fournier	Meeting agenda and discussion guide
09:35–10:05	Lisan Yu (WHOI, USA)	Keynote — Where Salinity Takes Control: The Meso-Submesoscale Thermohaline Transition and the Need for 10-km Salinity Sensing
10:05–10:30		Coffee Break / Poster Session

Session: Summer 2027 in the Arctic (Chair: Julian Schanze)

Time	Presenter	Title
10:30–10:45	Gesine Mollenhauer (remote, AWI, Germany)	Polarstern voyage to the Beaufort Sea to study the effects of the Mackenzie River outflow
10:45–11:00	Peter Gaube and Taylor Rowley (UW-APL and Williams College, USA)	FRESH Arctic Kick-off: Fate of River Export and Surface Hydrology

Session: Arctic Processes (Chairs: Marie Zahn and Carlyn Schmidgall)

Time	Presenter	Title
11:00–11:15	Semyon Grodsky (remote, University of Maryland, USA)	On the link between Chukchi Sea SSS and Bering Strait inflow
11:15–11:30	Joan Bergas-Ques (remote, ICM-CSIC, Spain)	Exploring salinity and density fluxes variability in the Nordic Seas through new satellite products: insights from ESA's Polar Science Cluster ARCTIC-FLOW project
11:30–11:45	Chao Liu (remote/recorded, CNRS, IFREMER, France)	Estimating Regional and Pan-Arctic Freshwater Content Variability from Satellite Sea Surface Salinity
11:45–12:00	Maria Tzortziou (City College of New York, USA)	FORTE: Frontlines of Rapidly Transforming Ecosystems
12:00–13:30		Lunch
13:30–13:45	Peter Gaube (UW-APL, USA)	Surface Salinity Controls Upper-Ocean Stratification in Open Waters of the Arctic Ocean
13:45–14:00	Mike Steele (UW-APL, USA)	MicroSWIFT buoys measure SST and SSS in the Alaskan Arctic

14:00–14:15	Fred Bingham (UNC Wilmington, USA)	Float Observations in the Beaufort Sea — Preliminary Results
14:15–14:30	Anastasia Piliouras (Penn State University, USA)	Modeling flow through Arctic deltas: new approaches with SWOT and network-based models
14:30–14:45	Wayana Dolan (US Geological Survey, USA)	Let's connect! Tracking the connectivity-associated movement of water and sediment through Arctic deltas using optical satellite imagery
14:45–15:00	Ben Kopec (Michigan Technological University, USA)	High-resolution freshwater partitioning with continuous seawater isotopic ($\delta^{18}O$, $\delta^{2}H$) tracing
15:00–15:30		Coffee Break / Poster Session
15:30–15:45	Jim Thomson (UW-APL, USA)	Drifting and moored observations of coastal river plumes along the North Slope of Alaska
15:45–16:00	Marie Zahn (NASA JPL, USA)	Riverine Freshwater Effects on Fall Sea Ice Freeze-Up in the Beaufort Sea
16:00–16:15	Dimitris Menemenlis (San Jose State University, USA)	Sea surface salinity in the llc4320v2 global-ocean-ice-river-tides simulation
16:15–17:00	Leads: Julian Schanze and Severine Fournier	Discussion

Wednesday, 20 May 2026

Session: Mission, Sensors, and Retrievals (Chair: Tony Lee)

Time	Presenter	Title
08:30–08:45	Nicolas Reul (remote, IFREMER/LOPS, France)	The Copernicus Imaging Microwave Radiometer (CIMR) Mission
08:45–09:00	Jacqueline Boutin (remote, LOCEAN/CNRS, France)	Beyond L-Band: Wideband (0.4–2 GHz) Radiometry for Observing Surface Salinity in Cold Seawater
09:00–09:15	Nemesio Rodriguez-Fernandez (remote, CNRS, CESBIO, France)	The Fine Resolution Explorer for Salinity, Carbon and Hydrology (FRESCH) L-band mission
09:15–09:30	Alex Akins (NASA JPL, USA)	A Promising Avenue for High-Resolution Remote Sensing of SSS From Space
09:30–09:45	Veronica Gonzalez-Gambau (remote, BEC, ICM-CSIC, Spain)	Assessing CryoRad Mission Performance Using an End-to-End Simulator for Wideband Ocean Salinity Retrieval
09:45–10:00	Liu Hao (remote, National Space Science Center, China)	The first year in-orbit performances of MICAP (Microwave Imager Combined Active and Passive) onboard Chinese Ocean Salinity Satellite
10:00–10:30		Coffee Break / Poster Session
10:30–10:45	Ray Schmitt (WHOI, USA)	Toward an Interferometer for Absolute Salinity
10:45–11:00	Sidharth Misra (NASA JPL, USA)	Coastal and Polar Salinity Remote Sensing Solutions — Near-surface, Airborne, and Spaceborne
11:00–12:00	Leads: Tony Lee and Alex Akins	Discussion
12:00–13:30		Lunch

Session: Open Ocean Processes (Chair: Clovis Thouvenin)

Time	Presenter	Title

13:30–13:45	Antoine Hochet (remote, LOPS, CNRS, Ifremer, IRD, France)	The Role of Large-Scale Seasonal Cycle Advection in Maintaining the Mean Ocean Salinity Distribution
13:45–14:00	Nicolas Reul (remote, IFREMER/LOPS, France)	Salinity Signatures of Gulf Stream Eddies: statistics over 15 years of L-band radiometer observation
14:00–14:15	Laifang Li (Pennsylvania State University, USA)	Sea surface salinity signatures precedent the Pineapple Express and the implications for rainfall prediction beyond weather time
14:15–14:30	Ray Schmitt (WHOI, USA)	On the Stability of the Atlantic Meridional Overturning Circulation in our Warming Climate
14:30–14:45	Justin Small (remote, NSF NCAR, USA)	Comparisons of salinity and temperature budgets in the upper ocean
14:45–15:00	Subra Bulusu (University of South Carolina, USA)	Coupled Salinity–Temperature Extremes and Upper-Ocean Stratification During Marine Heatwaves in the Northwest Atlantic
15:00–15:30		Coffee Break / Poster Session
15:30–15:45	Aneesh Subramanian (remote, University of Colorado Boulder, USA)	Assessing the Impact of Satellite Sea Surface Salinity Assimilation on Upper-Ocean Stratification and Thermal Variability in GEOS-S2S v2
15:45–16:00	Shineng Hu (Duke University, USA)	Salinity-Induced Eastward Flow in Boreal Spring Favors Extreme El Niño
16:00–16:15	Tony Lee (NASA JPL, USA)	What atmospheric forcings cause the eastward extension of the western-Pacific fresh pool during El Niño?
16:15–17:00	Leads: Clovis Thouvenin and Sreelekha Jarugula	Discussion

Thursday, 21 May 2026

Session: Salinity Products and Cal/Val (Chair: Roberto Sabia)

Time	**Presenter**	**Title**
08:30–08:45	Gael Alory (remote, LEGOS, France)	Near Real Time Processing of Underway Salinity Data from Ships of Opportunity
08:45–09:00	Florian Le Guillou (remote, Datlas, France)	Physics-informed estimation of high-resolution gridded SSS maps using the VarDyn framework
09:00–09:15	Fabrice Bonjean (remote, LOCEAN/CNRS, France)	CCI+SSS: Enhancing observations of sea surface salinity to meet climate challenges
09:15–09:30	Oleg Melnichenko (Earth & Space Research, USA)	Recent Updates to the Multi-Mission Sea Surface Salinity Optimum Interpolation (OISSS) Analysis Version 3
09:30–09:45	Estrella Olmedo (remote, ICM-CSIC, Spain)	CCI-OSHF: A new ESA Climate Change Initiative to enhance ocean surface heat fluxes estimates
09:45–10:15		Coffee Break / Poster Session
10:15–10:30	Thomas Meissner (remote, Remote Sensing Systems, USA)	Detection and flagging of radio frequency interference contamination in SMAP ocean observations
10:30–10:45	Julian Schanze (Earth & Space Research, USA)	Towards SSS Fiduciary Reference Measurements: An Overview of Sub-Footprint Variability, Stratification, and Calibration-Validation Methods
10:45–12:00	Leads: Jesse Anderson and Roberto Sabia	Discussion

12:00–13:30		Lunch

Session: Coastal Ocean Processes and Biogeochemistry (Chair: Fred Bingham)

Time	Presenter	Title
13:30–13:45	Jamie Shutler (remote, University of Exeter, UK)	Salinity's Role in Ocean Carbon Cycling and Acidification
13:45–14:00	Scott Durski (Oregon State University, USA)	Assessment of salinity variability in the Bering Sea from satellite-based observations and a coupled ice-ocean model, with comparison to concurrent work on the Northern California Current System
14:00–14:15	Clovis Thouvenin (LEGOS, France)	Drivers of Mississippi freshwater plume variability and export toward Florida: insights from long-term remote sensing observations and a regional ocean model ensemble
14:15–14:30	Dipanjan Chaudhuri (UW-APL, USA)	The Radiative Trap: How River Water Modulates Equatorial Ocean Heat Uptake
14:30–14:45	Sreelekha Jarugula (NASA JPL, USA)	Coastal Salinity: a proxy for human and natural hydrological cycle change
14:45–15:00	Alexander Kurapov (NOAA NOS/OCS/CSDL/CMMB, USA)	Seasonal and interannual variability in the ocean surface salinity along the US West Coast
15:00–15:30		Coffee Break / Poster Session
15:30–16:45	Leads: Severine Fournier and Tony Lee	Discussion
16:45–17:00	Tony Lee / Severine Fournier (NASA JPL, USA)	Closing Remarks

Poster Session

Arctic Ocean Processes

Presenter	Title
Marie Zahn (NASA/Caltech JPL, USA)	SASSIE ECCO: A new High-resolution Arctic Ocean and sea ice state Estimate
Carlyn Schmidgall (UW-APL, USA)	Observations of (sub)mesoscale salinity and temperature variability from underway CTD
Dongmei Feng (University of Cincinnati, USA)	Improving continuous estimates of global river discharge with satellites

Mission, Sensors, and Retrievals

Presenter	Title
Alex Akins (NASA/Caltech JPL, USA)	SMAP's Decadal View of L-band Ocean Surface Emissivity

Open Ocean Processes

Presenter	Title
Sreelekha Jarugula (NASA JPL, USA)	Using ECCO State Estimate to understand the decadal variation of upper-ocean salinity in the Southeast Indian Ocean

Salinity Products and Cal/Val

Presenter	Title
Jesse Anderson (Earth & Space Research, USA)	Characterization of SMAP Salinity Dataset Biases and Errors
So-Hyun Kim (Ulsan National Institute of Science and Technology, South Korea)	AI-Driven Global Sea Surface Salinity Retrieval from Ocean Color
Sebastien Guimbard (remote, Ocean-Scope, France)	Pi-MEP: Advanced Multi-Mission Tools for Satellite Salinity Assessment
Jacqueline Boutin (remote, LOCEAN/CNRS, France)	Novel Global and Arctic SSS fields developed at CATDS CEC-OS
Laetitia Parc (remote, ACRI-ST, France)	C3S Sea Surface Salinity
Estrella Olmedo (remote, ICM-CSIC, Spain)	Polar Monitoring from Space: BEC SSS Data Products

Coastal Ocean Processes

Presenter	Title
Jihun Jung (Oregon State University, USA)	Sea Surface Salinity Variability in the Gulf of Anadyr, Bering Sea
Bahram Khazaei (NOAA NOS, USA)	Shelf-interior ocean transport of terrestrial waters and other factors determining sea surface salinity variability in the coastal transition zone of the Northeastern Pacific region
Mary Burkitt-Gray (WHOI, USA)	Toward an Interferometer for Absolute Salinity