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Twenty-second meeting
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Contribution to the twenty-second meeting of the United Nations Open-ended Informal Consultative Process on Oceans and the Law of the Sea

Submitted by the United States of America

1. The United States was pleased to propose ocean observing as the topic of the twenty-second meeting of the United Nations Open-ended Informal Consultative Process on Oceans and the Law of the Sea, and we are grateful for the opportunity to participate in this important meeting. The Informal Consultative Process is the ideal venue to highlight the importance of ocean observing in gathering the data needed to drive sound policy decisions on the critical ocean issues we face today. The United States is proud of the body of work our Government and partners have produced, and the cutting-edge technology we have deployed collectively to improve ocean observations in support of marine protection, weather forecasting, tsunami warnings, climate change, maritime commerce and more.

2. The United States is pleased to submit the documents listed below as contributions to the work of the Informal Consultative Process. This collection of reports, plans, strategies, research products, outcome documents, policy statements and analyses offers an overview of the contributions the United States Government and our non-governmental partners have made and continue to make to the ocean observing community.

United States Government ocean observing documents

(a) Report of the Second International Operational Satellite Oceanography Symposium[1] co-organized by the National Oceanic and Atmospheric Administration (NOAA) to increase the benefits of satellite data throughout the value chain by strengthening the links from data to knowledge. The report includes key recommendations to capitalize on satellite observations to substantially improve ocean and coastal environmental applications and decision-making;

[1] Available at https://www.eventsforce.net/eumetsat/frontend/reg/thome.csp?pageID=7979&eventID=18&traceRedir=2.

(b) The *2021 NOAA Science Report*[2] includes multiple contributions to science-based decision-making in polar waters are reported. Chapter 1.A.1 highlights ocean observation by National Oceanic and Atmospheric Administration scientists;

(c) The *Arctic Research Plan 2022–2026*[3] (pp. 27 to 29) includes plans for providing sustained observations and monitoring to support research activities in the Arctic;

(d) A *Report on Priorities for Weather Research*[4] provides information on weather research and forecasting. One of the focuses of the report is filling critical observation gaps by completing existing networks and establishing new networks that utilize new technologies;

(e) *Changes in the Arctic: Background and Issues for Congress*[5] includes a budget request for important Arctic observational networks with relevant background information;

(f) *Antarctic Sea Ice Variability in the Southern Ocean-Climate System: Proceedings of a Workshop*.[6] The workshop discussed ways to advance understanding of Antarctic sea ice and its relationship to the broader ocean-climate system;

(g) The *Report on the Implementation of the National Ocean Policy*[7] details plans to expand existing ocean observations in the United States and updates on observation, mapping and infrastructure objectives;

(h) *Final Recommendations of The Interagency Ocean Policy Task Force*.[8] One of the national priority objectives is to strengthen and integrate federal and non-federal ocean observing systems, sensors, data collection platforms, data management and mapping capabilities into a national system;

(i) *State of the Climate 2020: Global Oceans*[9] explains how ocean observing is essential for climate and weather science;

(j) The latest *Ocean, Coastal, and Great Lakes Acidification Research Plan: 2020–2029* [10] guides research at the National Oceanic and Atmospheric Administration and provides a framework for the updated research plan. The report documents and predicts environmental change via monitoring, analysis and modelling and details the Administration's acidification research goals. One of these goals is to expand and advance observing systems and technologies to improve the understanding and predictive capability of acidification trends and processes;

(k) The *National Strategy for a Sustained Network of Coastal Moorings*[11] examines, defines and provides recommendations for a sustained network of coastal ocean observation moorings surrounding the United States coastline, including United States territories and the Great Lakes region;

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[2] Available at https://sciencecouncil.noaa.gov/Portals/0/Science%20Report/The%20FINAL%202021%20NOAA%20Science%20Report%20_MW_3-21.pdf.

[3] Available at https://www.iarpccollaborations.org/uploads/cms/documents/final-arp-2022-2026-20211214.pdf.

[4] Available at https://sab.noaa.gov/wp-content/uploads/2021/11/PWR-Report_24Nov2021_Draft.pdf.

[5] Available at https://crsreports.congress.gov/product/pdf/R/R41153/159.

[6] Available at https://nap.nationalacademies.org/read/24696/chapter/1.

[7] Available at https://obamawhitehouse.archives.gov/sites/default/files/docs/nop_highlights__annual_report_final_-_150310.pdf.

[8] Available at https://obamawhitehouse.archives.gov/files/documents/OPTF_FinalRecs.pdf.

[9] Available at https://ametsoc.net/sotc2020/Chapter%203-BAMS2020-FINAL-FINAL.pdf.

[10] Available at https://oceanacidification.noaa.gov/ResearchPlan2020/Download.aspx.

[11] Available at https://cdn.ioos.noaa.gov/media/2017/12/NationalStrategyforSustainedNetworkofCoastalMoorings_FINAL.pdf.

(l) *Tropical Pacific Observing System: Final Report 2021*.[12] The Tropical Pacific Observing System is designed to monitor and observe the tropical Pacific and to meet the experimental and operational needs of today and the future. Observations of the region are critical to support prediction systems for ocean, weather and climate services. Variability of this strongly coupled atmosphere-ocean system reverberates across the global climate and provides a principal source of interannual climate predictability extending worldwide;

(m) *A Network Gaps Analysis for the National Water Level Observation Network: Updated Edition*[13] assesses the size and geospatial density of water level stations. The recapitalization plan[14] documents recapitalization requirements to maintain the National Water Level Observation Network. The Network is a permanent observing system that includes 210 continuously operating water level stations throughout the United States and its territories;

(n) *Progress report: unmapped U.S. waters*.[15] The third annual progress report on United States ocean, coastal and Great Lakes mapping was recently released by the Interagency Working Group on Ocean and Coastal Mapping. As of January 2022, United States waters are 52% unmapped – this is a 1% gain in mapping coverage since the last annual report. Knowledge of the depth, shape, and composition of the seafloor has far-reaching benefits, including safer navigation, hazard mitigation for coastal resilience, preservation of marine habitats and heritage, a deeper understanding of natural resources for sustainable ocean economies, and tracks progress toward important goals such as Seabed 2030 and the National Ocean Mapping, Exploration, and Characterization strategy;

(o) *The Ocean Enterprise: a study of US business activity in ocean measurement, observation and forecasting*[16] of United States business activity in ocean measurement, observation and forecasting and *The Ocean Enterprise 2015 – 2020: A Study of U.S. New Blue Economy Business Activity*,[17] which identifies opportunities for growing the Blue Economy and finding new ways to observe and measure the ocean;

(p) *The U.S. Integrated Ocean Observing System: A Blueprint for Full Capability: Version 1.0*[18] is aimed at developing and sustaining the U.S. Integrated Ocean Observing System;

(q) *The U.S. IOOS Enterprise Strategic Plan 2018–2022*[19] for a globally linked and nationally coordinated federal and non-federal network of observations and data management;

(r) OceanObs'19: An Ocean of Opportunity articles[20] in advance of the OceanObs'19 conference:

[12] Available at https://tropicalpacific.org/wp-content/uploads/2021/08/TPOS2020-Final-Report-2021.08.23.pdf.
[13] Available at https://tidesandcurrents.noaa.gov/publications/Technical_Memorandum_NOS_COOPS_0048_Updt.pdf.
[14] Available at https://tidesandcurrents.noaa.gov/publications/Techrpt094RecapitalizationPlan_v_0.1_hw_rl_Final_081021a_hw2.pdf.
[15] Available at https://iocm.noaa.gov/documents/mapping-progress-report2022.pdf.
[16] Available at https://cdn.ioos.noaa.gov/media/2017/12/oceanenterprise_feb2017_secure.pdf.
[17] Available at https://cdn.ioos.noaa.gov/media/2021/12/OE-REPORT-2015_2020-FINAL_120721_web.pdf.
[18] Available at https://cdn.ioos.noaa.gov/media/2017/12/us_ioos_blueprint_ver1.pdf.
[19] Available at https://cdn.ioos.noaa.gov/media/2018/02/US-IOOS-Enterprise-Strategic-Plan_v101_secure.pdf.
[20] Available at https://www.frontiersin.org/research-topics/8224/oceanobs19-an-ocean-of-opportunity.

(i) “A global ocean observing system (GOOS), delivered through enhanced collaboration across regions, communities, and new technologies”;[21]

(ii) “The U.S. integrated ocean observing system: governance milestones and lessons from two decades of growth”;[22]

(iii) “Meeting regional, coastal and ocean user needs with tailored data products: a stakeholder-driven process”;[23]

(iv) “Global observational needs and resources for marine biodiversity”;[24]

(v) “Coastal mooring observing networks and their data products: recommendations for the next decade”;[25]

(vi) “Data interoperability between elements of the global ocean observing system”;[26]

(vii) “From the oceans to the cloud: opportunities and challenges for data, models, computation and workflows”;[27]

(viii) “A sustained ocean observing system in the Indian Ocean for climate-related scientific knowledge and societal needs”;[28]

(ix) “A surface ocean CO2 reference network, SOCONET and associated marine boundary layer CO2 measurements”;[29]

(x) “On the future of Argo: a global, full-depth, multi-disciplinary array”;[30]

(s) The report from the OceanObs’19 conference[31] defined ocean observing needs and next steps;

(t) The special issue of *Oceanography* on observing,[32] funded by the United States National Oceanic and Atmospheric Administration, Bureau of Ocean Energy Management and National Aeronautics and Space Administration;

(u) The report of the National Academies of Sciences, Engineering and Medicine, *Sustaining Ocean Observations to Understand Future Changes in Earth’s Climate*[33] identifies priority ocean observations and the challenges associated with sustaining these observations long-term;

(v) *Integrated Ocean Carbon Research: A Summary of Ocean Carbon Research, and Vision of Coordinated Ocean Carbon Research and Observations for the Next Decade*.[34]

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[21] Available at https://www.frontiersin.org/articles/10.3389/fmars.2019.00291/full.
[22] Available at https://www.frontiersin.org/articles/10.3389/fmars.2019.00242/full.
[23] Available at https://www.frontiersin.org/articles/10.3389/fmars.2019.00290/full.
[24] Available at https://www.frontiersin.org/articles/10.3389/fmars.2019.00367/full.
[25] Available at https://www.frontiersin.org/articles/10.3389/fmars.2019.00180/full.
[26] Available at https://www.frontiersin.org/articles/10.3389/fmars.2019.00442/full.
[27] Available at https://www.frontiersin.org/articles/10.3389/fmars.2019.00211/full.
[28] Available at https://www.frontiersin.org/articles/10.3389/fmars.2019.00355/full.
[29] Available at https://www.frontiersin.org/articles/10.3389/fmars.2019.00400/full.
[30] Available at https://www.frontiersin.org/articles/10.3389/fmars.2019.00439/full.
[31] Available at https://www.oceanobs19.net/wp-content/uploads/2020/05/RCN-Workshop-Report-_-FINAL_050120.pdf.
[32] Available at https://tos.org/oceanography/issue/volume-34-issue-02.
[33] Available at https://nap.nationalacademies.org/catalog/24919/sustaining-ocean-observations-to-understand-future-changes-in-earths-climate.
[34] Available at https://unesdoc.unesco.org/ark:/48223/pf0000376708.