Weekly Report – June 26, 2026

Cooperative Institute for Satellite Earth System Studies (CISESS)

NOAA/NESDIS/STAR

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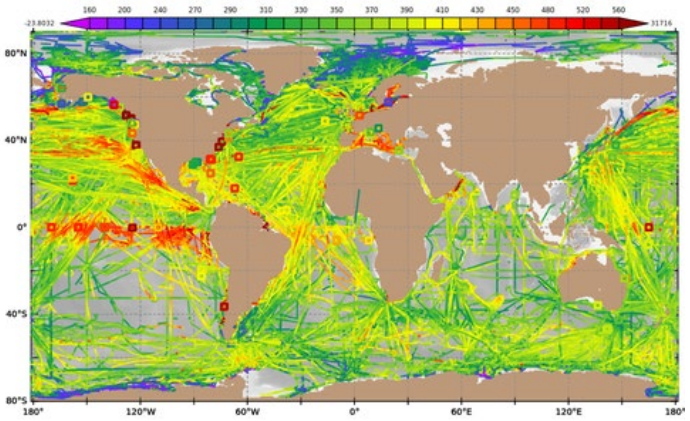
Date of Submission: 26 June 2026

Data and Information

Surface Ocean CO_2 Atlas and Global Ocean Data Analysis Project Updates

CISESS Scientist Alex Kozyr announces that new versions of the Surface Ocean CO_2 Atlas Database and the Global Ocean Data Analysis Project are now archived and published in the Ocean Carbon and Acidification Data System.

- The new version of the Surface Ocean CO2 Atlas Database Version 2026 (SOCATv2026) (NCEI Accession 0315110) data synthesis product:



The Surface Ocean CO_2 Atlas (SOCAT) is a synthesis activity for quality-controlled, surface ocean fCO_2 (fugacity of carbon dioxide) observations by the international marine carbon research community (over 100 contributors). SOCAT version 2026 has quality-controlled in-situ surface ocean fCO2 (fugacity of CO_2) measurements on ships, moorings, sailing yachts, autonomous and drifting surface platforms for the global ocean and coastal seas from 1957 to 2025. The main SOCAT synthesis and gridded products contain fCO2 values with an estimated accuracy of better than 5 µatm. Sensor fCO2 data with an estimated accuracy of better than 10 µatm are separately available.

- The new version of the Global Ocean Data Analysis Project version 3 (GLODAPv3), an internally consistent biogeochemical data product for the World Ocean (NCEI Accession 0315582):

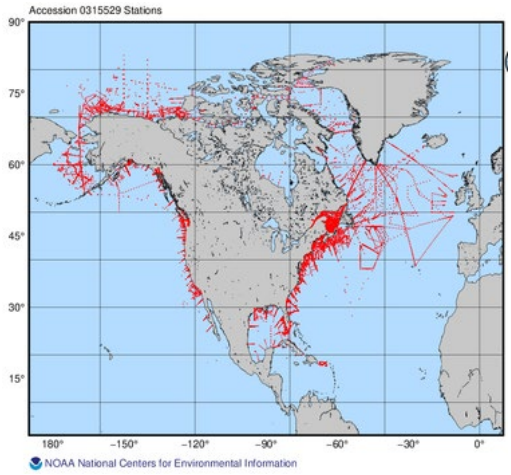
The Global Ocean Data Analysis Project (GLODAP) is a synthesis effort providing surface-to-bottom ocean biogeochemical observations determined through chemical analysis of discrete bottle samples, with an emphasis on seawater inorganic carbon chemistry and related variables. Version 3 of GLODAP comprises data from 1181 cruises, spanning more than 50 years of observations (1972–2023).

(Text provided by Kozyr and rearranged/edited by Cribb)

(Alex Kozyr, CISESS, alex.kozyr@noaa.gov, Funding: NCEI)

Coastal Ocean Data Analysis Product in North America (CODAP-NA) Update

CISESS Scientists Hyelim Yoo, Li-Qing Jiang, Wei-Jun Cai, and Alex Kozyr, along with colleagues from around the world, have recently published the latest version of the Coastal Ocean Data Analysis Product in North America (CODAP-NA, Version 2026), covering the period 23 August 1981 to 23 November 2024 (NCEI Accession 0315529). This version of CODAP-NA comprises 32,250 oceanographic profiles from 446 research cruises covering all continental shelves in North America, greatly increasing the spatiotemporal coverage of coastal biogeochemical measurements. Data for 14 variables (temperature; salinity; dissolved oxygen concentration; dissolved inorganic carbon concentration; total alkalinity; pH on the Total Scale; carbonate ion concentration; fugacity of carbon dioxide; and concentrations of silicate, phosphate, nitrate, nitrite, nitrate plus nitrite, and ammonium) is provided and available to the public.

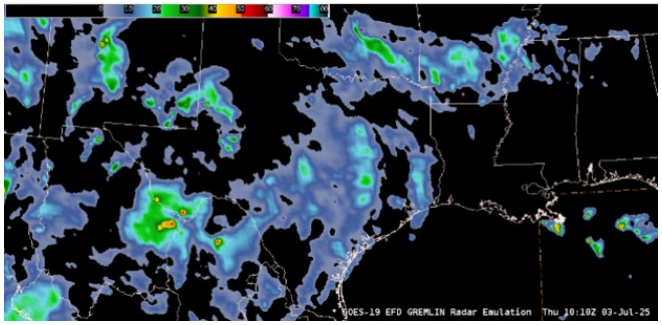


(Text provided by Cribb)

(Hyelim Yoo, CISESS, hyelim.yoo@noaa.gov, Funding: NCEI; Li-Qing Jiang, CISESS, liqing.jiang@noaa.gov, Funding: NCEI; Wei-Jun Cai, CISESS, wcai@udel.edu, Funding: OAP; Alex Kozyr, CISESS, alex.kozyr@noaa.gov, Funding: NCEI)

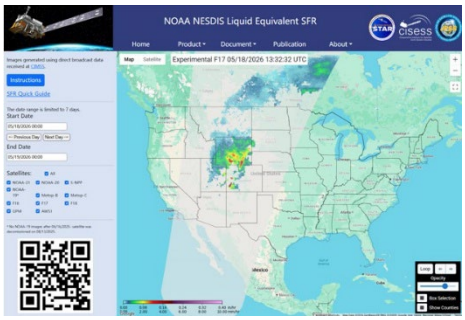
TRAINING AND EDUCATION

CISESS Scientists Lead Training for "AI (Artificial Intelligence) Applications Using Environmental Satellite Remote Sensing Data" AMS Short Course



CISESS Scientist Christopher Smith, the GOES-R Satellite Liaison to the National Weather Service's Weather Prediction Center and Ocean Prediction Center, led training for an American Meteorological Society (AMS) short course on 17 June 2026. The short course, "AI Applications Using Environmental Satellite Remote Sensing Data", aimed to demonstrate the use of artificial intelligence (AI) and machine learning (ML) in developing and improving environmental satellite applications. Smith presented on an 'Introduction to Environmental Satellite Remote Sensing' training session and provided resources on existing ML satellite products and manners to access satellite training datasets. Over 300 participants attended the training session, with very positive feedback at the end of it all.

Figure: GOES-East GOES Radar Estimation via Machine Learning to Inform NWP (GREMLIN) output at 1010 UTC 03 July 2025, simulating radar reflectivity. These simulations are useful in areas where there are no weather radars. The "GREMLIN ML Basics" part of Smith's training session (at time point 1:09:30 of the video recording) provides more details.



CISESS Scientist Yongzhen Fan also participated in this AMS short course, co-presenting on "Creating AI-Ready Datasets" during the training session on 18 June 2026. Fan's part of the session was titled "Global Precipitation Type Dataset for Snowfall Detection From Satellite Passive Microwave Sensors", where he introduced the audience to satellite remote sensing of snowfall and offered guidance on data collocation and visualization.

(Text provided by Smith and Cribb)

(Christopher Smith, CISESS, csmith70@umd.edu, Funding: GOES-R PGRR; Yongzhen Fan, CISESS, yfan1236@umd.edu, Funding: DACS, IIJA, JSTAR & Seed Grant)

PUBLICATIONS

New Research Improves VIIRS Thermal Sensor Calibration
Citation: Wang, Wenhui, Taeyoung Choi, Slawomir Blonski, and **Xi Shao**, 2026: Evaluation and intercomparison of S-NPP, NOAA-20, and NOAA-21 VIIRS thermal emissive band long-term on-orbit saturation radiances. *J. Appl. Remote Sens.*, **20**(2), https://doi.org/10.1117/1.JRS.20.027501.
Summary: The Visible Infrared Imaging Radiometer Suite (VIIRS) thermal emissive band (TEB) sensor data record (SDR) is widely used for wildfire, volcano, and gas-flare monitoring and other thermal anomaly studies. In their paper published in the *Journal of Applied Remote Sensing*, CISESS Scientists Wenhui Wang and Xi Shao evaluate and intercompare Suomi National Polar-orbiting Partnership (S-NPP), NOAA-20, and NOAA-21 VIIRS TEB on-orbit saturation radiance changes over time. They present a method for estimating TEB saturation radiances using the VIIRS thermal model, prelaunch characterization results, on-orbit degradation factors, instrument temperatures, and telemetry data. The method was applied to all VIIRS TEBs except for the fire band M13 due to challenges in accurately characterizing its on-orbit degradation. For imager resolution bands I4 and I5, S-NPP has higher saturation radiances than NOAA-20 and NOAA-21. S-NPP I5 detector level saturation radiances have increased by 2 to 5 K after ~14 years on-orbit due to gradual on-orbit responsivity degradations. Moreover, the I5 radiance limit used in the NOAA operational processing and reprocessing is suboptimal for S-NPP (especially in recent years) and NOAA-21 during its early mission (launch to 3 March 2023).

However, it can be improved using results from this study, suggesting that the proposed method can estimate VIIRS TEB saturation radiances reasonably well. The methodology and results presented in this paper are valuable for improving VIIRS on-orbit calibration by enabling better-quality high radiance observations in TEB SDR products, eventually benefiting downstream applications.

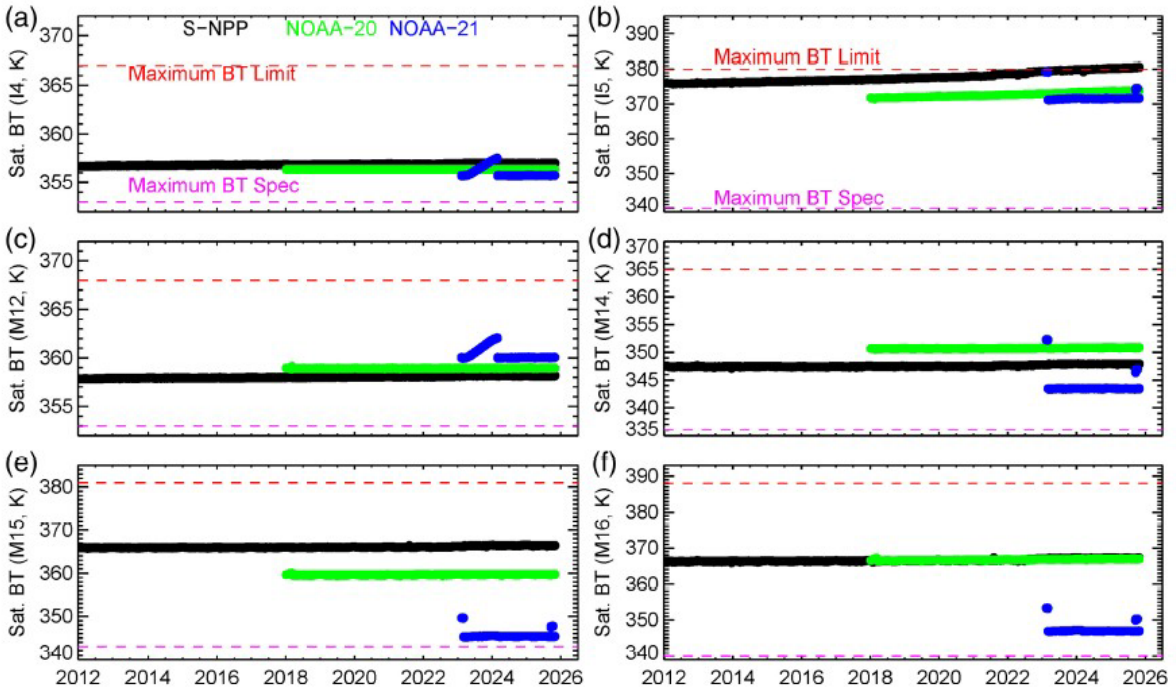


Figure: Comparison of estimated S-NPP, NOAA-20, and NOAA-21 VIIRS TEB band-averaged on-orbit saturation radiances at nadir: (a) I4, (b) I5, and moderate-resolution bands (c) M12, (d) M14, (e) M15, and (f) M16. BT stands for brightness temperature.

(Text provided by Wang and lightly edited by Cribb)

(Wenhui Wang, CISESS, whwang1@umd.edu, Funding: JSTAR & STAR; Xi Shao, CISESS, xshao@umd.edu, Funding: COSMIC2, JSTAR & STAR)

(Maureen Cribb, CISESS, mcribb@umd.edu, Funding: CISESS Task I)