Weekly Report – January 30, 2026

Cooperative Institute for Satellite Earth System Studies (CISESS)

NOAA/NESDIS/STAR

Submitted by: Maureen Cribb
Email: mcribb@umd.edu
Phone: 301-405-9344

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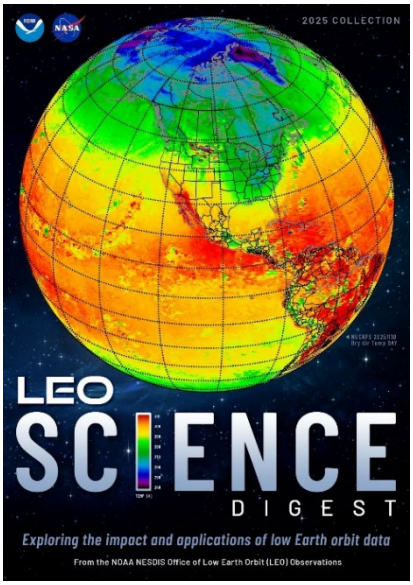
HIGHLIGHTS FOR NESDIS LEADERSHIP

People

CISESS Research Featured on the Cover of the Latest LEO Science Digest

The 2025 LEO Science Digest has been officially released this month. Research by CISESS Scientist Likun Wang was highlighted on the cover of the digest, selected by the NOAA LEO Office. Description of the cover image: "The image on the cover shows a polar vortex disruption that resulted in a blast of frigid Arctic air across much of the United States, causing widespread freeze alerts from Texas to the Carolinas as observed by CrIS and ATMS sensors on the NOAA-20 and NOAA-21 satellites on November 10, 2025. Air temperatures close to Earth's surface are retrieved using the NOAA-Unique Combined Atmospheric Processing System (NUCAPS). Image processing by Dr. Likun Wang, CISESS, University of Maryland at College Park." Wang expressed that it is exciting to see his work acknowledged in this way.



(Likun Wang, CISESS, likun.wang@noaa.gov, Funding: DACS, JPSS PGRR & JPSS PSDI)

TRAVEL AND MEETING REPORTS

CISESS Participation in the "Scientists Serving Communities" Workshop

On January 20 and 21, the University of Maryland's Earth System Science Interdisciplinary Center (ESSIC) hosted "Scientists Serving Communities", an annual workshop designed to empower Maryland community leaders, stakeholders, and decision-makers as a part of the Climate Resilience Network project. The free workshop offered a unique platform to directly engage with university researchers and subject matter experts in an informal and impactful moderated discussion. CISESS Scientist Ron Vogel served on a panel focused on water quality. Guangyang Fang and his student Ian Way presented a poster titled *Precipitation Formation VR Module: An Interactive Approach to Understanding Weather and Climate Processes* and hosted an activity where participants got to wear Meta Quest headsets to visualize in 3D how precipitation forms and evolves under varying environmental conditions. Many attendees

actively engaged with the VR application and provided positive feedback, highlighting its effectiveness for visualizing complex climate and Earth system concepts. CISESS Coordinator Kate Cooney also helped with coordination/logistics and was a meeting notetaker, along with CISESS Scientist Malarvizhi Arulraj. The event was successful, with over two hundred attendees!

Figure: (left image) Ian Way demonstrating the Precipitation Formation VR Module to ESSIC Director Prof. Lars Peter Riishøjgaard, underscoring leadership engagement and institutional support for immersive technologies. Photo credit: Guangyang Fang (right image) Ron Vogel (far right) in discussion during the session on monitoring/improving water quality. Photo credit: Cazzy Medley

(Malarvizhi Arulraj, CISESS, marulraj@umd.edu, Funding: JSTAR; Kate Cooney, CISESS, kscooney@umd.edu, Funding: CISESS Task I; Guangyang Fang, CISESS, gfang@umd.edu, Funding: GEO-XO, GOES-R AWG, GOES-R PGRR & IIJA; Ron Vogel, CISESS, vogelr@umd.edu, Funding: ORS)

TRAINING AND EDUCATION

CISESS Scientist Completes "Digital Earth and Artificial Intelligence for Sustainability" Workshop

CISESS Scientist Christopher Smith, GOES-R Satellite Liaison for the National Weather Service (NWS) Weather Prediction Center and Ocean Prediction Center, completed the "Digital Earth and Artificial Intelligence for Sustainability" Workshop. The workshop was held from 12–16 January 2026, led by the United Nations University Hub R-SIRUS (Remote Sensing and Sustainable Innovations for Resilient Urban Systems) and the City College of New York. An overview of remote sensing applications and machine learning (ML) was provided before participants were invited to complete a capstone project to forecast hourly river flows by using artificial neural networks. At the conclusion of the workshop, Smith presented lessons learned throughout the week, such as choosing specific types of neural networks (convolutional neural network, long short-term memory, etc.) depending on the application. Smith plans to apply artificial intelligence and ML techniques learned to help predict lead times of weather phenomena, such as convective initiation, thus improving products and services for the NWS.


UNU INWEH

The City College of New York

CERTIFICATE

This is to confirm that

Christopher Smith

has successfully completed the 5-day Professional Development Workshop in

Digital Earth and Artificial Intelligence for Sustainability

conducted online by R-SIRUS-Remote Sensing and Sustainable Innovations for Resilient Urban Systems, The City College of New York, January 12-16, 2026.

Prof. Kaveh Madani
Director, UNU-INWEH

Dean Alexander Couzis and Prof. Reza Khanbilvardi
Executive Co-Directors, R-SIRUS

(Christopher Smith, CISESS, csmith70@umd.edu; Funding: GOES-R PGRR)

PUBLICATIONS

The World's Oceans Keep on Warming
Citation: Pan, Yuying, Lijing Cheng, John Abraham, Kevin E. Trenberth, James Reagan, Juan Du, Zhankun Wang, Andrea Storto, Karina Von Schuckmann, Yujing Zhu, Michael E. Mann, Jiang Zhu, Fan Wang, Fujiang Yu, Ricardo Locarnini, John Fasullo, Boyin Huang, Garrett Graham, Xungang Yin, Viktor Gouretski, Fei Zheng, Yuanlong Li, Bin Zhang, Liying Wan, Xingrong Chen, Dakui Wang, Licheng Feng, Xiangzhou Song, Yulong Liu, Franco Reseghetti, Simona Simoncelli, Gengxin Chen, Rongwang Zhang, **Alexey Mishonov**, Wangxu Wei, Zhetao Tan, Guancheng Li, Lijuan Cao, Lifan Chen, Huifeng Yuan, Kewei Lyu, Albertus Sulaiman, Michael Mayer, Huizan Wang, Zhanhong Ma, Senliang Bao, Hengqian Yan, Zenghong Liu, Chunxue Yang, Xu Liu, Zeke Hausfather, Flora Gues, Xinyi Song, Miao Zhang, and Lin Chen, 2026: Ocean heat content sets another record in 2025. *Adv. Atmos. Sci.*, https://doi.org/10.1007/s00376-026-5876-0.
Summary: The world's oceans continue to warm, reports CISESS Scientist Alexey Mishonov and colleagues in the journal *Advances in Atmospheric Sciences*. This is an alarming situation given the impact on already fragile ocean ecosystems, not to mention the role of increased ocean warming on faster sea-level rise and more frequent and intense marine heatwaves, among others. Using several observational and reanalysis datasets produced by independent research groups, the authors report that globally, the upper-2000-m ocean heat content (OHC) increased

by ~23 ± 8 Zettajoules (ZJ) relative to 2024 according to Institute of Atmospheric Physics/Chinese Academy of Sciences estimates and confirmed by the Consiglio Nazionale delle Ricerche - Istituto di Scienze Marine Global historical Reanalysis and Copernicus Marine data. About 33% of the global ocean area reached the top three warmest values in their historical records. This concerning global ocean warming trend is expected to continue until net-zero greenhouse gas emissions are reached.

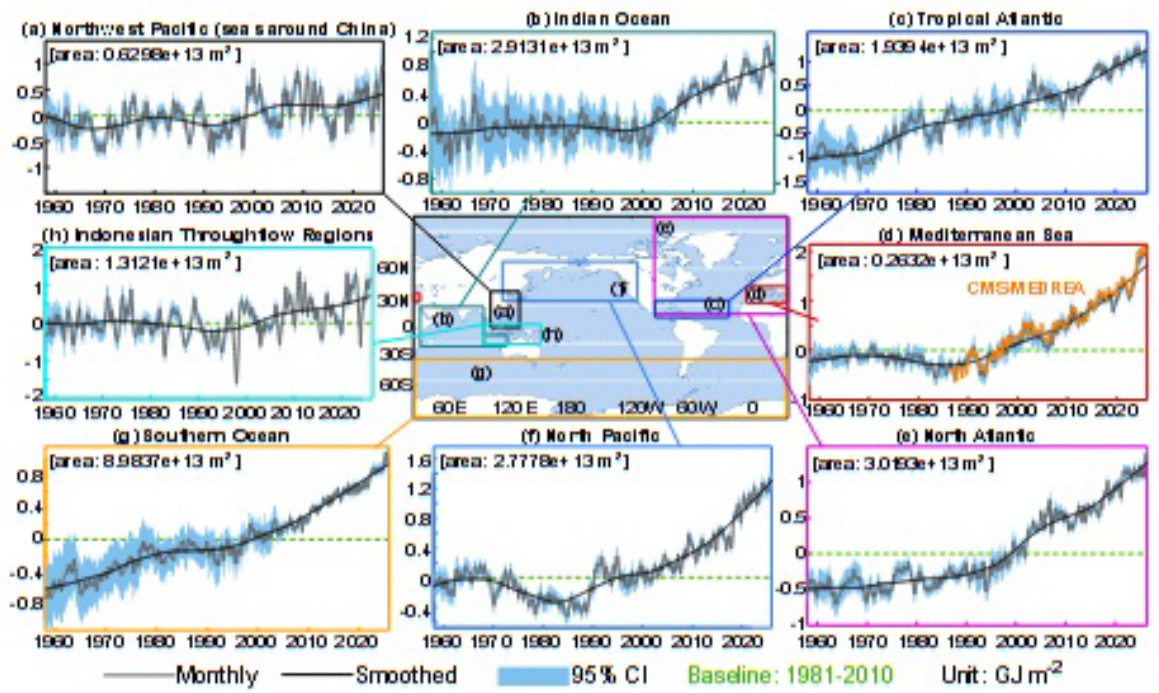


Figure: Regional observed upper-2000-m OHC change from 1958 through 2025 relative to a 1981–2020 baseline using Institute of Atmospheric Physics/Chinese Academy of Sciences data.

(Alexey Mishonov, CISESS, alexey.mishonov@noaa.gov; Funding: NCEI)

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