Weekly Report – August 21, 2026

Cooperative Institute for Satellite Earth System Studies (CISESS)

NOAA/NESDIS/STAR

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TRAVEL AND MEETING REPORTS

CISESS Presence at IGARSS and the COSPAR Scientific Assembly

CISESS Scientist Isaac Moradi and NOAA colleagues Satya Kalluri (NOAA/LEO) and Vijay Tallapragada (NOAA/NWS Office of Modeling and Development) presented a talk titled "Assimilation of CubeSat Microwave and Radar Observations in the NOAA Hurricane Analysis and Forecast System" at the Committee on Space Research (COSPAR) Scientific Assembly in Florence, Italy, which took place from August 1–9, 2026. They also presented a similar talk titled "Assimilation of Microwave and Radar Observations in the NOAA Hurricane Analysis and Forecast System" at the International Geoscience and Remote Sensing Symposium (IGARSS) 2026 in Washington, DC, held from August 9–14, 2026. The presentations discussed the assimilation of observations from NASA's Time-Resolved Observations of Precipitation structure and storm Intensity with a Constellation of Smallsats (TROPICS) small-satellite constellation, as well as EarthCARE Cloud Profiling Radar observations, into NOAA's Hurricane Analysis and Forecast System (HAFS). Results from several hurricanes and a typhoon show that incorporating TROPICS microwave observations generally improves forecasts of tropical cyclone track and intensity, particularly at longer forecast lead times. The high-revisit-frequency of TROPICS also helps fill temporal gaps between observations from traditional polar-orbiting microwave satellites, providing more frequent information for monitoring and forecasting tropical cyclones. EarthCARE observations are currently being used as a diagnostic tool to investigate the simulation of clouds and precipitation in the HAFS system, while work is underway to develop full data assimilation capabilities for these observations within NOAA's system.

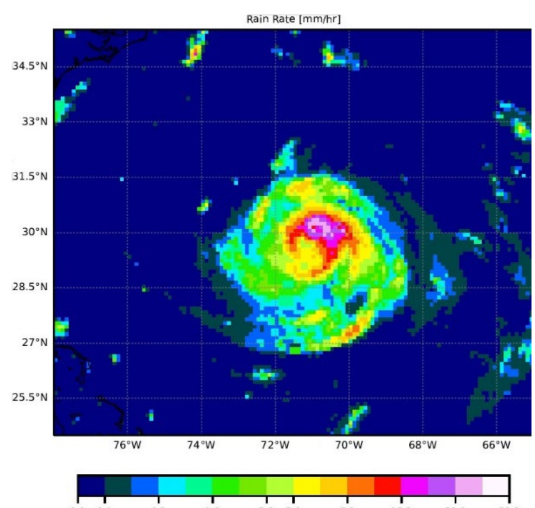

Figure: An example of HAFS precipitation simulations (rain rate in mm hr^{-1}) for Hurricane Franklin (2023).

CISESS Scientist Yulan Hong also attended IGARSS 2026, chairing the section on "Artificial Intelligence for Active and Passive Remote Sensing of Precipitation" and presenting

NOAA/NESDIS operational snowfall rate algorithm updates in a talk titled "The Effects of Ice Habit Models on Passive Microwave Snowfall Retrievals". The presentation demonstrated how a new multiple ice habit (MICE) algorithm improves the spatial distribution and magnitude of snowfall rates in the rain-snow transition zone compared to an algorithm that assumes a spherical ice habit. Statistics show that MICE reduces mean biases and root-mean-square errors (RMSEs) for snowfall systems with large cloud water paths (CWPs).

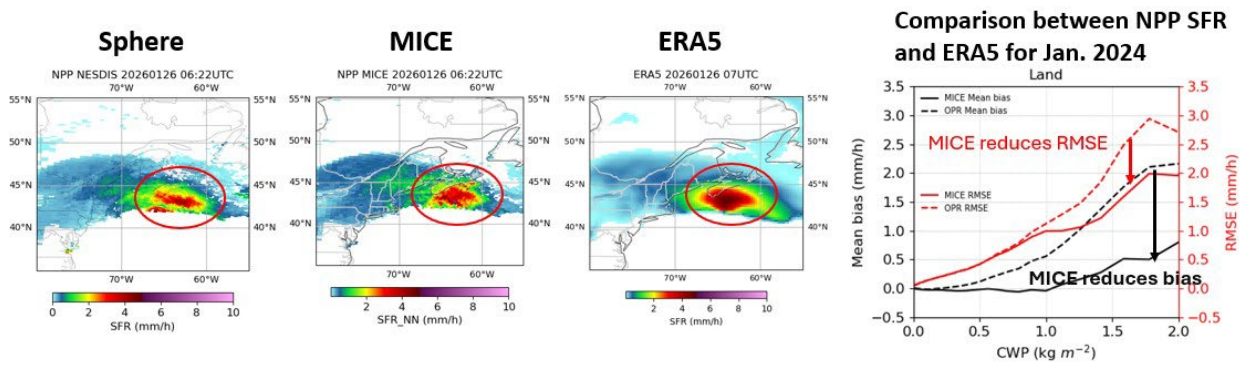

Figure: Three panels from left to right: spatial distributions of snowfall rate from the algorithm that assumes a spherical ice habit, the MICE algorithm, and the fifth-generation European Centre for Medium-Range Weather Forecasts Reanalysis (ERA5), serving as the ground truth. Rightmost panel: Mean biases (in black) and RMSEs (in red) from the "Sphere" (dashed lines) and MICE (solid lines) algorithms.

(Isaac Moradi, CISESS, imoradi@umd.edu, Funding: LEO; Yulan Hong, CISESS, yhong126@umd.edu, Funding: JSTAR)

SOCIAL MEDIA AND BLOG POSTS

Lala's Visit to Hawaii

Starting on 7 August 2026, a low-pressure system well to the east-southeast of Hawaii gradually blossomed into a tropical storm with gale-force winds six days later, earning the name Lala by then. Lala subsequently became the first hurricane to directly hit the Big Island in over a century. In his latest [blog post](), CISESS Scientist Christopher Smith, the GOES-R Satellite Liaison to the National Weather Service's Weather Prediction Center and Ocean Prediction Center, shares some illustrative animations showing the evolution of Hurricane Lala as it left flooding rains and power outages in its wake.

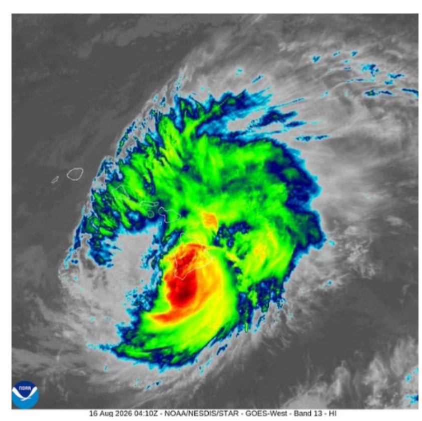

Figure: GOES-West Full Disk Band 13 IR imagery at 11:40 UTC 16 August 2026.

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

PUBLICATIONS

State of the Climate 2025
Citation: Blunden, Jessica; and James Reagan, Eds., 2026: “State of the Climate in 2025”. *Bull. Amer. Meteor. Soc.*, **107**(8), Si–S512, https://doi.org/10.1175/2026BAMSStateoftheClimate.1.
Summary: The annual State of the Climate Special Supplement published by the Bulletin of the American Meteorological Society, edited by Jessica Blunden and James Reagan (no longer at CISESS), is based on contributions from scientists from around the world. It provides a detailed update on global climate indicators, notable weather events, and other data collected by environmental monitoring stations and instruments located on land, water, ice, and in space. A number of CISESS Scientists (bolded names; underlined first authors are from NOAA) have contributed to the latest State of the Climate report. Their contributions are as follows:

Global Climate Chapter

Cooper, Owen R., Jerry Ziemke, Kai-Lan Chang, Peter Effertz, Shobha Kondragunta, **Kai Yang**, Zigang Wei, Satya Kalluri, Kevin Bowman, Elyse Pennington, J. L. Laughner, and V. H. Payne, 2026: Tropospheric ozone [in “State of the Climate in 2025”]. *Bull. Amer. Meteor. Soc*., **107**(8), S94–S97, https://doi.org/10.1175/BAMS-D-26-0141.1.

Steinbrecht, Wolfgang, Mark Weber, Carlo Arosio, Ronald van der A, Laura M. Ciasto, Melanie Coldewey-Egbers, Sean Davis, Doug Degenstein, Peter Effertz, Vitali E. Fioletov, Larry Flynn, Stacey M. Frith, Lucien Froidevaux, Sophie Godin-Beekmann, Jos de Laat, Thierry Leblanc, Diego Loyola, Eliane Maillard Barras, Irina Petropavlovskikh, Richard Querel, Alexi Rozanov, Michelle Santee, Viktoria Sofieva, Kleareti Tourpali, Ray Wang, Taran Warnock, and **Jeanette D. Wild (retired)**, 2026: Stratospheric ozone [in “State of the Climate in 2025”]. *Bull. Amer. Meteor. Soc*., **107**(8), S100–S103, https://doi.org/10.1175/BAMS-D-26-0141.1.

Ziese, Markus, Russell S. Vose, Robert Adler, **Guojun Gu**, and Xungang Yin, 2026: Precipitation [in “State of the Climate in 2025”]. *Bull. Amer. Meteor. Soc*., **107**(8), S59–S60, https://doi.org/10.1175/BAMS-D-26-0141.1.

Global Oceans Chapter

Jersild, Annika, Rik Wanninkhof, Joaquin A. Triñanes, Peter Landschützer, Richard A. Feely, and Brendan R. Carter, 2026: Global ocean carbon cycle [in “State of the Climate in 2025”]. *Bull. Amer. Meteor. Soc*., **107**(8), S211–S214, https://doi.org/10.1175/BAMS-D-26-0100.1.

Johnson, Gregory C., John M. Lyman, Lijing Cheng, Donata Giglio, Rachel E. Killick, Ricardo Locarnini, **Alexey Mishonov**, Mitsuho Oe, James Reagan and Thea Sukianto, 2025: Ocean temperature and heat content [in "State of the Climate in 2025"]. *Bull. Amer. Meteor. Soc.*, **107**(8), S182–S185, https://doi.org/10.1175/BAMS-D-26-0100.1.

The Arctic Chapter

Meier, Walter N., Stefan Hendricks, Alek Petty, Donald Perovich, **Sinead Farrell**, Melinda Webster, Dmitry Divine, Sebastian Gerland, Lars Kaleschke, Robert Ricker, Xiangshan Tian-Kunze, and Angela Bliss, 2026: Sea ice cover [in "State of the Climate in 2025"]. *Bull. Amer. Meteor. Soc.*, **107**(8), S318–S320, https://doi.org/10.1175/BAMS-D-26-0123.1.

(Sinead Farrell, CISESS, sinead.farrell@noaa.gov, Funding: Jason; Guojun Gu, CISESS, ggu@umd.edu, Funding: COSMIC2; Annika Jersild, CISESS, ajersild@umd.edu, Funding: GOMO; Alexey Mishonov, CISESS, alexey.mishonov@noaa.gov, Funding: NCEI; Kai Yang, CISESS, kaiyang@umd.edu, Funding: LEO & METOP-SG)

Clumped Methane: A New Tool for Monitoring Climate
Citation: Sivan, Malavika, **Jiayang Sun**, Patricia Martinerie, Maria Elena Popa, James Farquhar, Maarten Krol, Carina van der Veen, Bibhasvata Dasgupta, Mojhgan A. Haghnegahdar, Camilla Marie Jensen, Ji-Woong Yang, Johannes Freitag, Kévin Fourteau, Thomas Blunier, and Thomas Röckmann, 2026: Anthropogenic perturbations to atmospheric methane reflected in Greenland firn air clumped isotope measurements. *Sci. Adv.,***12**, eaeb2203, https://doi.org/10.1126/sciadv.aeb2203.
Summary: The amount of methane (CH_4) in the atmosphere has been increasing since preindustrial times, accelerating in growth since 2007. Although bulk isotopes of CH_4 give some sign of what is driving this increase, there are so many other man-made and natural drivers that it is hard to get a full picture of what is going on. CH_4 molecules with two heavy isotopes, so-called clumped isotopes of CH_4, namely, $\Delta^{13}CH_3D$ and $\Delta^{12}CH_2D_2$, may shed more light on this. In their paper published in *Science Advances*, Jiayang Sun (no longer with CISESS) and colleagues present an ice core analysis focused on air samples trapped in firn collected in northeastern Greenland. Of the two clumped isotopes, $\Delta^{12}CH_2D_2$ values show a clear and significant increase of ~10‰ in the firn column examined, much larger than typical measurement uncertainties of 1–1.4‰. Further analyses show that a $\Delta^{12}CH_2D_2$ variation of this magnitude cannot be explained by recent changes in CH_4 sources. Through simulations, the authors report that $\Delta^{12}CH_2D_2$ captures a strong human influence on the global CH_4 cycle from 1300 to 2025. An informal conversation with authors Drs. Sun and Farquhar about this study can be found here.

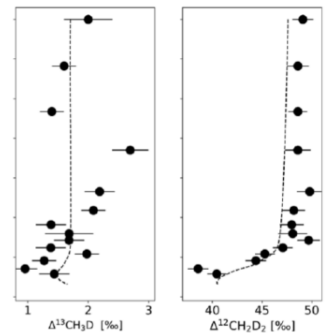

Figure: Isotopic compositions from firn air samples collected at different depths: (left) $\Delta^{13}CH_3D$ and (right) $\Delta^{12}CH_2D_2$. The black dashed lines show results from the Institut des Geosciences de l'Environnement-Grenoble Images Parole Signal Automatique laboratoire firn model. A clearer vertical gradient is seen in the right panel.

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