Weekly Report – April 03, 2026

Cooperative Institute for Satellite Earth System Studies (CISESS)

NOAA/NESDIS/STAR

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HIGHLIGHTS FOR NESDIS LEADERSHIP

People

Surprise Celebration of Maureen Cribb's 25 Years at ESSIC

On April 1st, CISESS Coordinator Maureen Cribb got surprised, but it was not an April Fool's Day prank! When Maureen arrived at the weekly CISESS Coordinators team meeting, the room was full of extra attendees and a cake. Maureen instantly became the guest of honor at the celebration of her 25 years with the UMD Earth System Science Interdisciplinary Center (ESSIC). Maureen is the very first person to achieve this milestone at ESSIC. In honor of the occasion, CISESS Executive Director Lars Peter Riishojgaard, Professor Zhanqing Li, and others shared their deepest gratitude to her decades working at ESSIC, including over two years as CISESS Coordinator. We look forward to celebrating her continued support!

Figure: ESSIC Director & CISESS Executive Director Lars Peter Riishojgaard, Maureen Cribb, and ESSIC Assistant Director Andrew Negri. Photo credit: Kate Cooney

(Kate Cooney, CISESS, kscooney@umd.edu, Funding: CISESS Task I)

TRAVEL AND MEETING REPORTS

CISESS Scientist Presents at the GSICS Annual Meeting

The Global Space-based Inter-Calibration System (GSICS) Annual Meeting was held in Ottawa, Canada during the week of 23 March 2026. CISESS Scientist Wenhui Wang gave a presentation titled "*Improving the Deep Convective Cloud (DCC) Method for VIIRS using AI/ML based BRDF Models*". This study investigated the feasibility of using the artificial intelligence/machine learning (AI/ML) PyTorch Multilayer Perceptron (MLP) neural network to develop bidirectional reflectance distribution function (BRDF) models for improving the DCC method for the Visible Infrared Imaging Radiometer Suite (VIIRS). MLP and angular-bin-based BRDF models were

trained/developed using NOAA-20 VIIRS (the current GSICS on-orbit solar band reference) DCC observations during 2022-2004. NOAA-20 DCC data during other years (2018-2021 and 2025) and NOAA-21 VIIRS DCC data (2022–2025) were used for validation. For shortwave infrared bands, monthly land ocean MLP-based BRDF models are promising, outperforming the annual cycle correction and running faster than traditional angular-bin-based models. For visible and near infrared (VNIR) bands, the existing Hu2004 model outperforms the MLP and angular-bin-based models, likely due to gaps and non-uniformly distributed VIIRS observations. The AI/ML-based VIIRS DCC BRDF models for VNIR will be further improved.

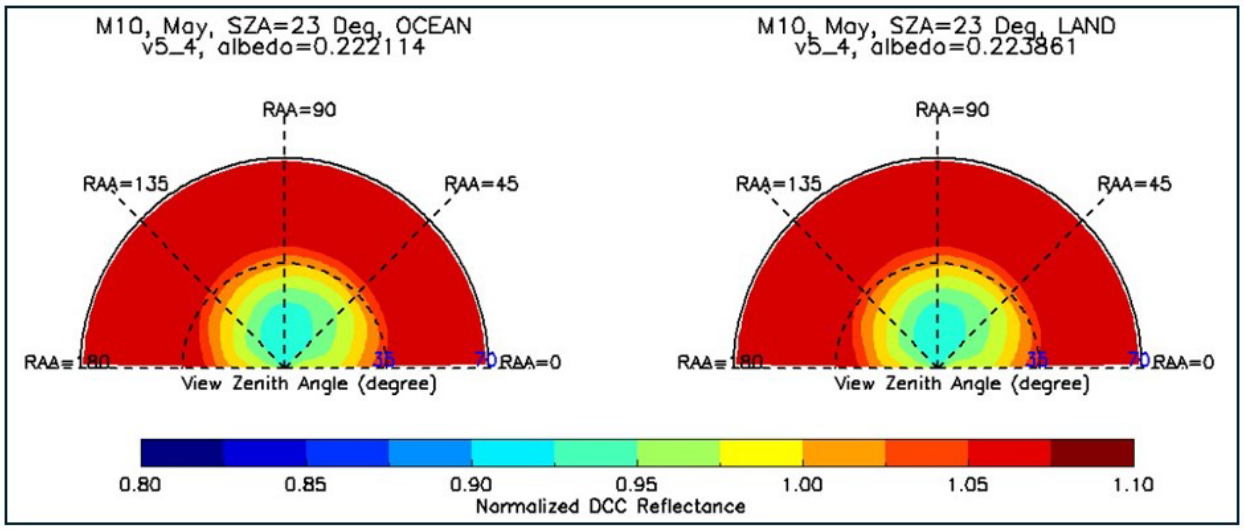

Figure: Examples of AI/ML MLP-based monthly land ocean separate VIIRS BRDF models for band M10 (month: May).

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

PUBLICATIONS

Wildfires Are Disrupting the Atmospheric Nitrogen Cycle in the CONUS
Citation: Campbell, Patrick C., **Daniel Q. Tong**, Shinkuang Chang, Siqi Ma, Yunyao Li, Jiaxin Ding, Rick Saylor, Barry Baker, Youhua Tang, and John Walker, 2026: Increased contributions of climate-driven wildfires to nitrogen deposition in the United States. *Commun. Earth Environ.*, **7**, 254, https://doi.org/10.1038/s43247-026-03279-4.
Summary: Reactive nitrogen (Nr) includes all nitrogen compounds in the atmosphere and biosphere that are active in biological, chemical, or radiative processes, such as nitrogen oxides (NO_x) and ammonia (NH_3), among others. Thanks to environmental regulations and technological advances, air pollutants like NO_x have generally decreased over the past decades. However, there is growing evidence that wildfires are contributing more and more to levels of detrimental Nr, especially in the northwest U.S. where wildfire seasons have become

increasingly long and intense. A clearer understanding is needed of multi-decadal fire activity and how it influences changes in Nr emissions, deposition, and impacts on downwind ecosystems across the contiguous United States (CONUS). CISESS Scientists Patrick Campbell and Daniel Tong and coauthors aim to fill this gap in knowledge in their paper published in the journal *Communications Earth & Environment*. The authors applied the George Mason University North American chemical reanalysis system to carry out two sets of state-of-the-science 20-year (2002–2021) coupled weather-chemical transport model simulations, one "with-fire" impacts and the other "without-fire" impacts, to quantify the change in relative trends and contributions of fire sources to total Nr emissions and deposition trends over the CONUS. A major result is that there are increasing trends in the contribution of wildfires to higher Nr emissions, deposition, and critical load exceedances of up to 20–40% due to fires in the western U.S., harming downwind ecosystems. Nr deposition in the eastern U.S. is also seeing a smaller upward trend of less than 5%.

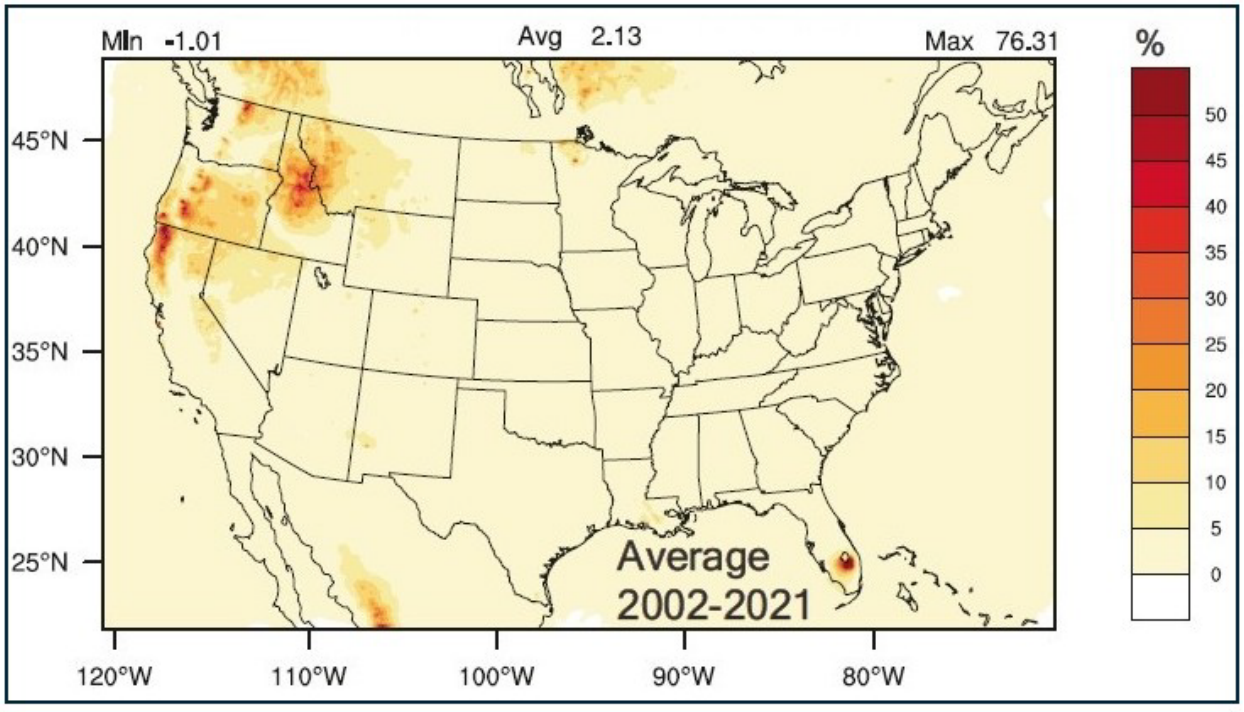

Figure: Relative change in average (2002–2021) total reactive nitrogen deposition [(FIRE minus NOFIRE)/NOFIRE).

(Patrick Campbell, CISESS, patrick.c.campbell@noaa.gov, Funding: ARL; Daniel Tong, CISESS, daniel.tong@noaa.gov, Funding: ARL)

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