Weekly Report – November 07, 2025

Cooperative Institute for Satellite Earth System Studies (CISESS)

NOAA/NESDIS/STAR

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

Date of Submission: 07 November 2025

HIGHLIGHTS FOR NESDIS LEADERSHIP

Promotion of Lars Peter Riishojgaard to Full Professor

This is the press release written by Prof. Sumant Nigam and originally posted on the Earth System Science Interdisciplinary Center website.

The Department of Atmospheric and Oceanic Science (AOSC) has announced the appointment of Lars Peter Riishojgaard as a Full Professor. Riishojgaard has been the Director of the Earth System Science Interdisciplinary Center (ESSIC) and Executive Director of the Cooperative Institute for Satellite Earth System Studies (CISESS) for almost a year and has chosen AOSC as his tenure home.

Riishojgaard is a data assimilation scientist with notable expertise in advanced data assimilation methods that seek to increase and improve the use of satellite data in numerical-weather-prediction-related applications. He led the development of the Physical-space Statistical Analysis System (PSAS) at the core of NASA/GSFC's Data Assimilation Office's efforts. In the US, Lars Peter last headed the multi-agency Joint Center for Satellite Data Assimilation in Boulder. Riishojgaard also has exceptional expertise in the climate policy area, honed through decades of governance and leadership of weather and climate organizations in Europe and the United Nations, especially the World Meteorological Organization (WMO), where his last appointment was Director of the Global Greenhouse Gas Watch at the WMO Secretariat.

Riishojgaard is eager to engage with the AOSC academic and research community. He is scheduled to teach the undergraduate course *AOSC 365: Climate Change – Cutting through the Noise* and is actively seeking to recruit graduate students for his research endeavors.

(Lars Peter Riishojgaard, CISESS, lriishoj@umd.edu; Funding: Task 1 & Admin.)

PUBLICATIONS

A New Diagnostic Tool for Evaluating Madden-Julian Oscillation Teleconnections

Citation: Stan, Cristiana, Saisri Kollapaneni, Andrea M. Jenney, Jiabao Wang, Zheng Wu, Cheng Zheng, Hyemi Kim, Chaim I. Garfinkel, and Ayush Singh, 2025: A Python diagnostics package for evaluation of Madden-Julian Oscillation (MJO) teleconnections in subseasonal-to-seasonal (S2S)

forecast systems. *Geosci. Model Dev.*, **18**, 7969–7985, https://doi.org/10.5194/gmd-18-7969-2025.

Summary: The Madden-Julian Oscillation (MJO) is mainly responsible for the intraseasonal (30- to 90-day) variability in the tropical atmosphere, affecting global weather in all sorts of ways. In a paper published in the journal *Geoscientific Model Development*, CISESS Scientist Cristiana Stan and colleagues introduce a new Python package that consists of metrics and diagnostics for the evaluation of the MJO and processes driving MJO teleconnections in forecast data, with the goal of helping users apply this package to their own particular set of forecast data. Written in Python v3.9.16, the package consists of a user-friendly graphical user interface and a collection of modular evaluation tools, including a tool for the evaluation of the MJO forecast skill. Some of the diagnostics are the Remote Influence of Periodic EventS indices for geopotential height at 500 hPa and precipitation, the pattern correlation coefficient and relative amplitude for the Pacific North American region, and the histogram of 10-hPa zonal wind. Additional useful diagnostics to add to the package are in the works, such as wave activity flux and the stationary wavenumber on the Mercator projection. Other improvements under consideration include rejigging the regridding algorithm to reduce the calculation run time.

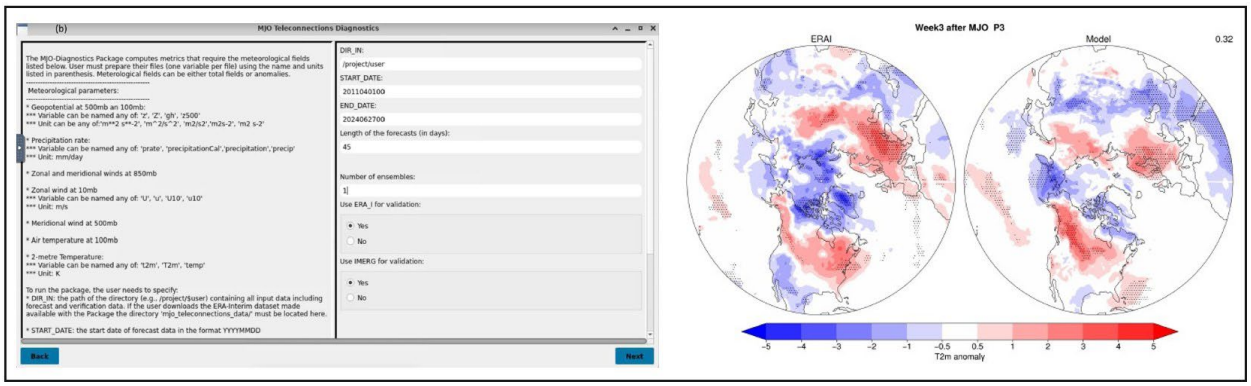

Figure: (Left) Part of the graphical user interface showing the window collecting user input for running diagnostics. (Right) An evaluation of the MJO on surface (at 2 m) air temperature (T2m): Composites of T2m daily anomalies in November to March for observations (ERA-Interim reanalysis, or ERAI) and the forecast (model) for week 3 following the MJO phase 3. Dotted regions indicate statistical significance. The number in the upper right corner (0.32) represents the pattern correlation between the two maps.

(Cristiana Stan, CISESS, cstan@gmu.edu; Funding: OSTI)

OTHER

Related UMD Work: Blending Digital Art with AI Stitching to Help Predict the Path of Icebergs
Art Associate Professor Cy Keener, Computer Science and UMIACS Assistant Professor Christopher Metzler, and CISESS Scientist (and Atmospheric and Oceanic Science/Geographical

Sciences Associate Professor) Sinéad Farrell are developing advanced AI-driven photogrammetry and sensor fusion techniques to enhance long-term coastal monitoring efforts. After identifying scientifically significant Arctic sea ice regions, Farrell will help collect data on underwater ridges via satellite remote sensing. The full article provides more cool details.

Figure: A preliminary rendering of the tip of a Greenland iceberg constructed with imagery from aerial drones and AI. (Model constructed by Russell Shomberg)

(Sinéad Farrell, CISESS, sinead.farrell@noaa.gov; Funding: Jason)

Seed Grant Mid-Term Report: *Developing a Basic Model Interface for Stream Water Temperature to Enhance Water Quality Predictions in NOAA's Next Generation Water Resources Modeling Framework*

The first half of 2025 found CISESS Scientist Nigus Melaku and colleagues making progress on integrating a semi-Lagrangian stream temperature module into NOAA's Next Generation Water Resources Modeling Framework (NextGen) via a Basic Model Interface (BMI). The first step of the project, successfully carried out, focused on identifying and reviewing BMI standards relevant to the integration of models within NOAA's NextGen framework, particularly those related to hydrological and water quality processes. Ongoing work includes adaptation of the stream temperature module for the NextGen architecture and once that is accomplished, test and validate the accuracy and reliability of the stream water temperature BMI model within

NextGen by applying it to three U.S. river basins representing distinct hydrological and climatic characteristics: the Upper Mississippi, Gunpowder Falls, and San Antonio.

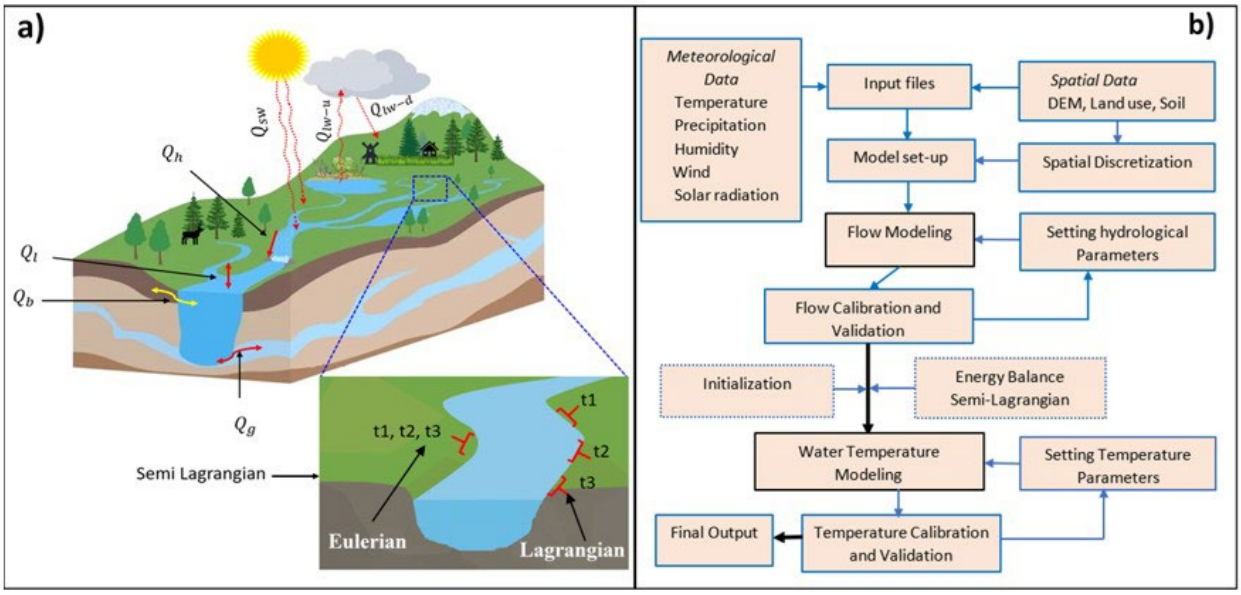

Figure: (a) Conceptual framework of semi-Lagrangian stream water temperature model and (b) representation of the modeling framework.

(Nigus Melaku, CISESS, nmelaku@umd.edu; Funding: Seed Grant)

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