Weekly Report – December 13, 2024

Cooperative Institute for Satellite Earth System Studies (CISESS)

NOAA/NESDIS/STAR

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HIGHLIGHTS FOR NESDIS LEADERSHIP

Partnerships

Satellite Liaison Meets with Japan Meteorological Agency Forecasters

On 4 December 2024, CISESS Scientist and Satellite Liaison to the National Weather Service (NWS) Weather Prediction Center (WPC) and Ocean Prediction Center (OPC), Christopher Smith, met with two Japan Meteorological Agency (JMA) Scientific Officers and a Senior Forecaster at the NOAA Center for Weather and Climate Prediction. The meeting included a presentation from Smith on satellite imagery in use at both WPC and OPC, as well as a presentation on the use of satellite imagery for weather forecasting at the JMA. Through this meeting, ideas were exchanged for using satellite imagery to better detect certain weather phenomena, as well as planning and training activities for new satellite capabilities, such as the Hyperspectral Infrared Sounder that will launch on Himawari-10 in 2028, informing applications of the GeoXO Sounder slated to launch in 2035. JMA currently operates Himawari-9, the main geostationary satellite used by the NWS OPC to monitor weather over the West Pacific, marking the importance of the NOAA-JMA partnership.

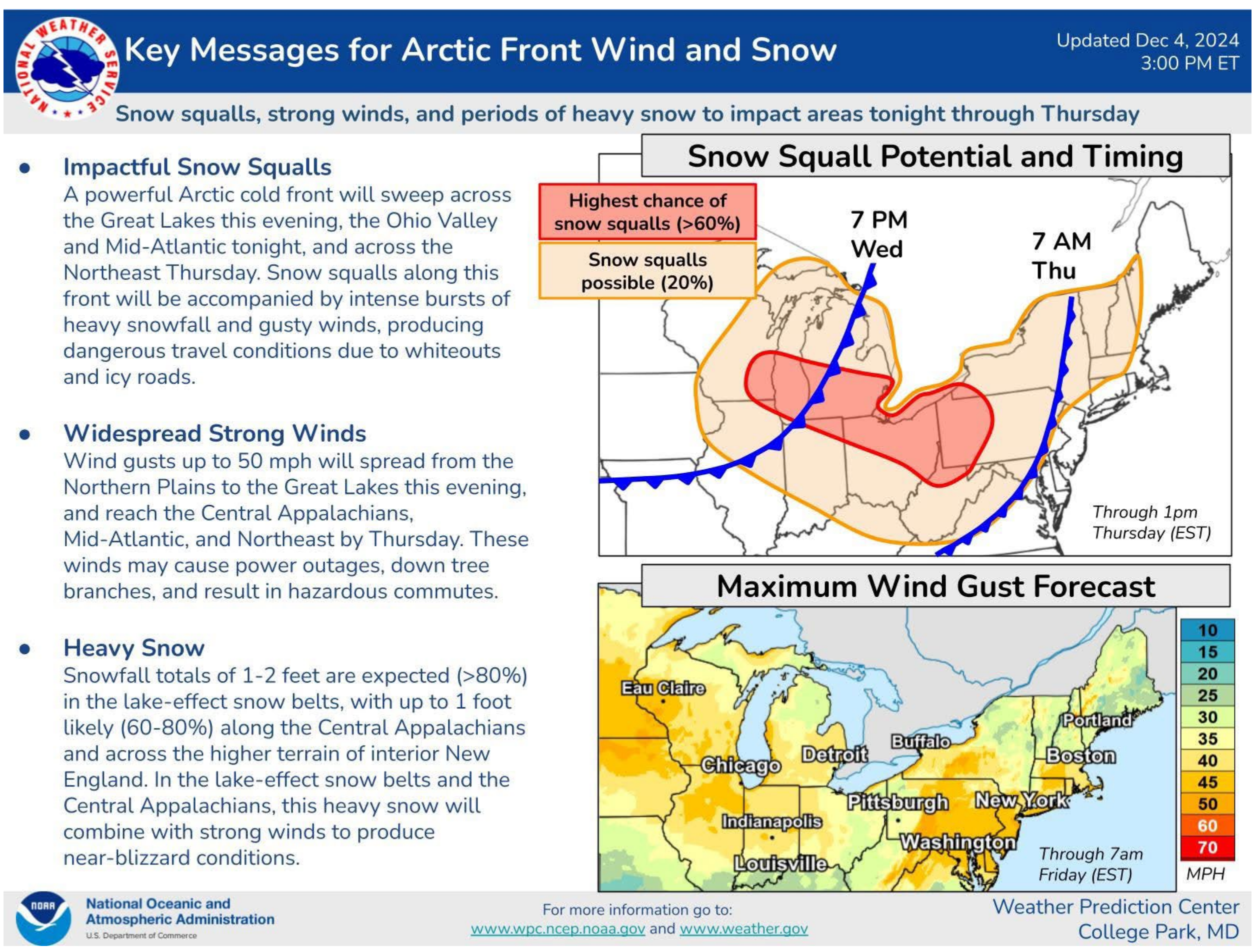
Figure. GOES-R Satellite Liaison, Christopher Smith (right) meets with two Scientific Officers (far left) and one Senior Forecaster (next to Smith) from JMA at the NCWCP on 4 December 2024.

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

SOCIAL MEDIA AND BLOG POSTS

Great Lakes and the Northeast Hit by Snow Squalls

In yet another colorful blog post highlighting the use of a variety of satellite resources to visualize interesting weather phenomena, CISESS Scientist and Satellite Liaison to the National Weather Service Weather and Ocean Prediction Centers Christopher Smith describes the early December snow squall event that made for dangerous travel conditions. This blast of air from the north resulted in thundersnow in Michigan and southwestern Pennsylvania, copious amounts of snow recorded in Michigan, Pennsylvania, and New York, and hurricane-force wind gusts observed in Michigan and North Carolina.



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

PUBLICATIONS

Examining the Summertime Surface Air Temperature Bias Over the U.S.
Citation: Choi, Nakbin, and **Cristiana Stan**, 2025: Large-scale surface air temperature bias in summer over the CONUS and its relationship to tropical central Pacific convection in the UFS Prototype 8. J. Climate, 38, 117-128, https://doi.org/10.1175/JCLI-D-24-0078.1.
Summary: Fully coupled global climate models are needed to predict with high skill extreme weather events on time scales between a week to a month. One such model is the NOAA National Centers for Environmental Prediction's Unified Forecast System (UFS) coupled model prototype 8 (P8), or UFS-P8. Studies have reported mean biases in surface air temperature bias and precipitation over the contiguous U.S. (CONUS) that have time-varying patterns, arising from tropical sea surface temperature biases in UFS-P8 forecasts. The recent study by CISESS Scientist Cristiana Stan and her colleague focuses on the summertime air temperature bias over the CONUS for the years 2011 to 2017 and identifies the source of biases in the UFS-P8. This was done by first doing an empirical orthogonal function analysis to determine the large-scale spatial pattern of the weekly surface temperature bias, followed by statistical and dynamical methods to relate the biases to upper-level atmospheric teleconnection biases. Atmospheric observational data from the European Centre for Medium-Range Weather Forecasts Reanalysis, version 5 (ERA5) was the dataset used for comparison purposes. Stan found that an east-west dipole pattern best describes the structure of the largest variability in the surface air temperature bias. Three major sources of this bias are also identified (see figure). This study helps to better understand where the UFS-P8 model can be improved.

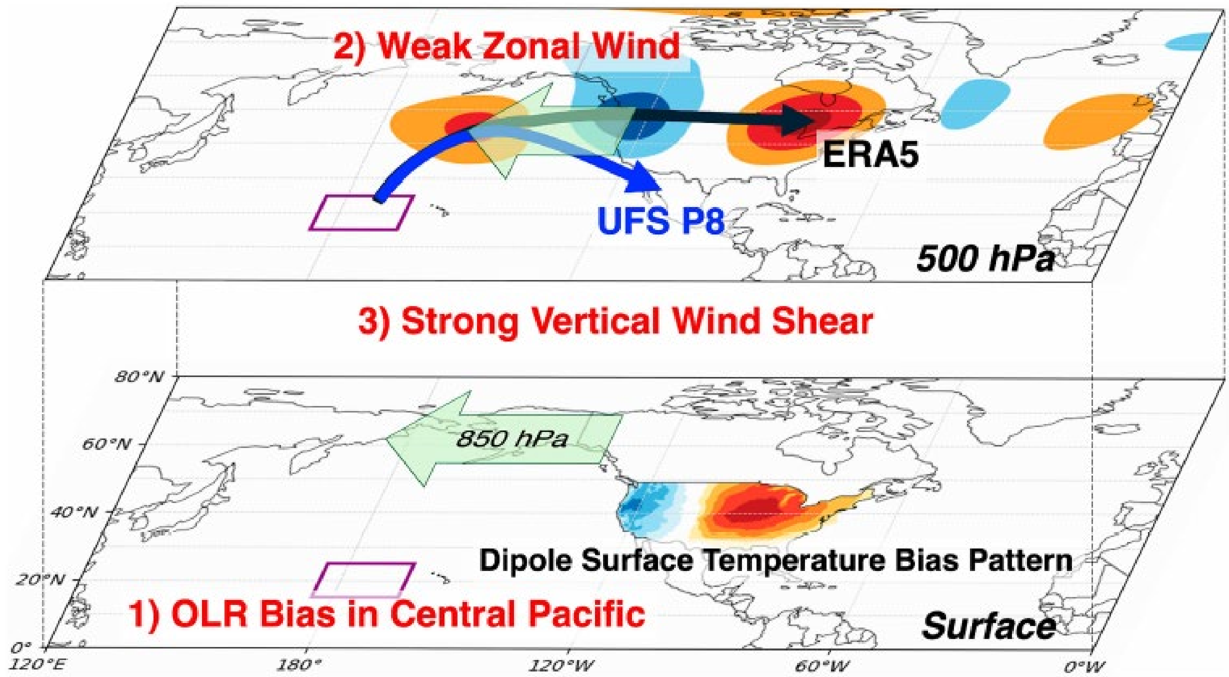


Figure. Schematic diagram of three sources of error of the surface air temperature bias pattern in UFS P8. Thick arrows indicate teleconnection paths in ERA5 (black) and UFS P8 (blue).

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

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