Publications

Retrieval of Downward Shortwave Radiation: CISESS Scientists Dongdong Wang and Shunlin Liang and CISESS-funded graduate student Aolin Jia, all from the UMD Department of Geographical Sciences, have a new article published in the October issue of *Remote Sensing of the Environment* evaluating satellite retrieval algorithms for downward shortwave radiation (DSR). The authors note that while there are many studies of algorithm development, product generation, and validation, few studies have looked at retrieval algorithms. They compare five retrieval methods: the forward parameterization approach, two physical inversion methods (look-up table (LUT) and optimization), and two statistical inversion methods (direct estimation and neural networks). The scientists found that the parametrization method had the highest accuracy but also the fewest valid retrievals. LUT results were comparable with parameterization and the neural network also had good error reduction results. They also proposed an algorithm-integration framework that combined the results of these DSR retrieval methods to further improve DSR estimation accuracy and consistency.

Figure: DSR maps generated from the five retrieval algorithms and the algorithm integration method using the MODIS/Terra swath obtained on June 6, 2013, 17:05 UTC.

(POC: Dongdong Wang, ddwang@umd.edu, Funding: JSTAR)

State of the Climate in 2020—The Arctic: CISESS Scientist Sinéad Farrell is one of the contributors to the new State of the Climate in 2020: The Arctic, released by the AMS with the August 2021 issue of BAMS. She co-authored the section on sea ice extent. 2020 marked the second lowest monthly and daily sea ice extent in the 42-year satellite record. The monthly and daily maximum sea ice extent was the highest since 2013 but this measure does not take into account reductions in thickness. In 2020, the “Northern Passage” sea route was open for about 2.5 months, compared to the average of less than a month. Loose ice packs in August 2020 allowed the German icebreaker RV Polarstern to reach the North Pole in August as part of the Multidisciplinary Drifting Observatory for the Study of Arctic Climate (MOSAiC).

![Sea ice extent maps for (a) Mar 2020 and (b) Sep 2020, with ice concentration >15% in white; the magenta contour indicates the median extent for 1981–2010.](image)

*Figure: Sea ice extent maps for (a) Mar 2020 and (b) Sep 2020, with ice concentration >15% in white; the magenta contour indicates the median extent for 1981–2010.*

(POC: Sinéad Farrell, sinead.farrell@noaa.gov; Funding: OSTS & Ocean Remote Sensing)

Media and Outreach

Rapid Sea Surface Changes Pose Risks: The NCEI News website featured CISESS Scientist Li-Qing Jiang’s new article on novel and disappearing climates in the global surface ocean from 1800 to 2100 (featured in SCSB/CISESS Weekly Report 8/6/21):

“Unlike previous research, the new work examined novel and disappearing climates across the entire ocean surface. The work looks at ocean climatologies, which are defined by long-term averages of a given variable, like sea surface temperature, over various time periods, usually spanning multiple decades. For this study, the analysis considers multiple variables simultaneously, instead of a single variable at a time. A novel ocean climate is one in which the temperature and chemistry of the water is different from that previously observed in the ocean surface, while a disappearing climate is one in which the temperature and chemistry of the water is common today, but will be rare or absent in the future.”


(POC: Li-Qing Jiang, liqing.jiang@noaa.gov , Funding: NCEI & OCAD)