Weekly Report

SCSB/CISESS
Cooperative Research Program Division (CoRP)
STAR/NESDIS
National Oceanic and Atmospheric Administration (NOAA)

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Publications

Satellite data establishes water clarity improvement at restored oyster reefs: Ron Vogel, CISESS senior faculty specialist, coauthored a NOAA Technical Memorandum with colleagues from NOAA's National Marine Fisheries Service, entitled "Using Satellite-Derived Total Suspended Matter Data to Evaluate the Impacts of Tributary-Scale Oyster Restoration on Water Clarity." The team sought to explore whether large-scale oyster restoration in the Chesapeake Bay, on the order of 100's of acres, can produce improvements in water clarity that are measurable, and whether satellites can be a tool to help measure that change. Because oysters are filter feeders, they remove particles from the water as they eat, potentially leading to clearer water. Using long-term measurements of total suspended matter concentration (TSM) from satellite, along with oyster biomass and submerged aquatic vegetation coverage, the team found that the satellite data helped to identify trends, and that there was a correlation between the most mature oyster reefs and decreased TSM over time. In-water studies have measured clearer water over restored reefs, but using satellites was a new method. The team is using this innovative technique to demonstrate the societal benefits from NOAA's investments in both habitat restoration and satellite missions. NOAA is part of the multi-agency, multi-organization Chesapeake Bay Program partnership, working to restore a healthy Chesapeake Bay.

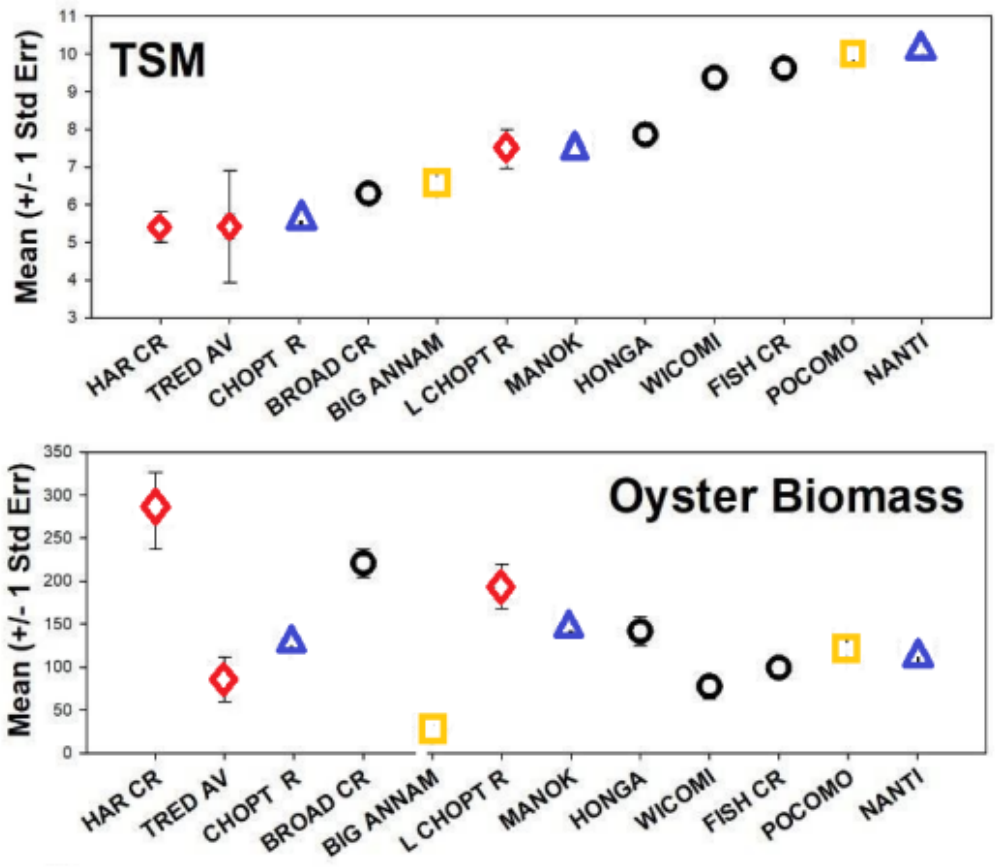


Figure: Temporal trend in TSM, represented spatially, shows highest negative slope (decreasing rate of change in TSM over time) in areas of most mature restored oyster reefs in the central portion of Chesapeake Bay.

Lazar, Jay; Ronald L. Vogel, David G. Bruce, and Andrew McGowan, 2022: Using Satellite-Derived Total Suspended Matter Data to Evaluate the Impacts of Tributary-Scale Oyster Restoration on Water Clarity. NOAA Tech. Memo NMFS-OHC-10, 19 pp., available at: https://spo.nmfs.noaa.gov/content/tech-memo/using-satellite-derived-total-suspended-matter-data-evaluate-impacts-tributary.

(POC: R. Vogel, ronald.vogel@noaa.gov , Funding: Ocean Remote Sensing)

Mean Sea-Level Pressure Trends in the Southern Ocean: CISESS Consortium Scientist Peter Romanov (CUNY), who has four CISESS tasks on snow and ice products from satellites, has a new article published this month in the *Journal of Oceanological Research*. In this paper, trends in the mean sea-level pressure (SLP) in Antarctica in the last four decades (1980-2020) are examined using in situ observations and reanalysis data. The analysis involved time series of monthly mean, season-mean and yearly-mean values of the SLP derived from four reanalysis

datasets, NCEP/NCAR, ERA5, JRA55, MERRA2, and from surface observations acquired from the Reference Antarctic Data for Environmental Research (READER) dataset. The results of the analysis confirmed the dominance of decreasing trends in the annual mean SLP in Antarctica (see Figure). Larger negative trends were found in the Western Antarctica with the most pronounced pressure drop in the South Pacific. The long-term decrease in the annual mean SLP in Antarctica was due to strong negative pressure trends in the austral summer and fall season whereas in winter and in spring the trends turn to be mixed and mostly positive. The comparison of multiyear time series of SLP reanalysis data with in situ observations at Antarctic stations revealed a considerable overestimate of negative SLP trends in the NCEP/NCAR dataset. Among the four examined reanalysis datasets, ERA5 provided the best agreement with the station data on the annual mean and monthly mean SLP trend values.

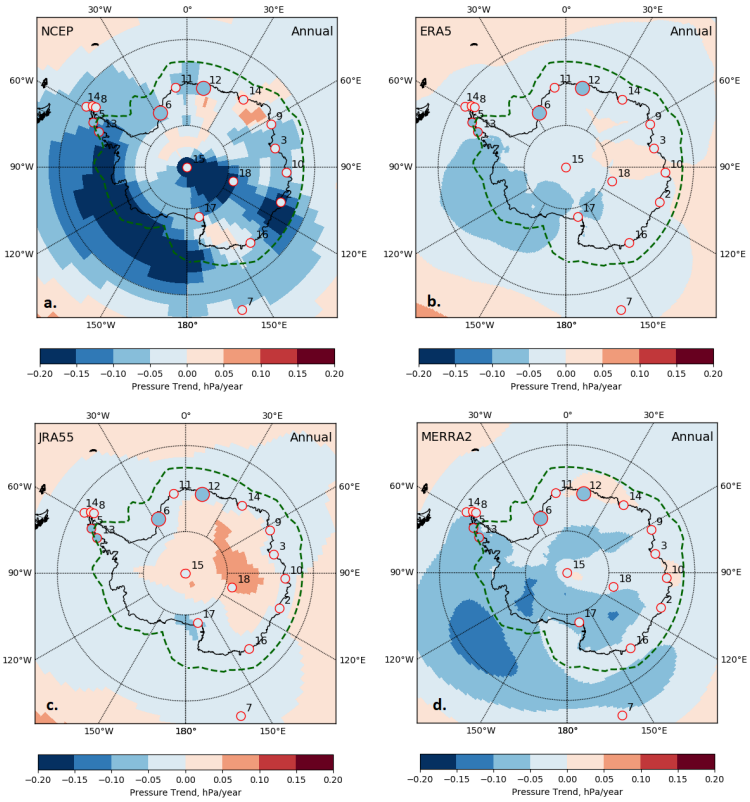


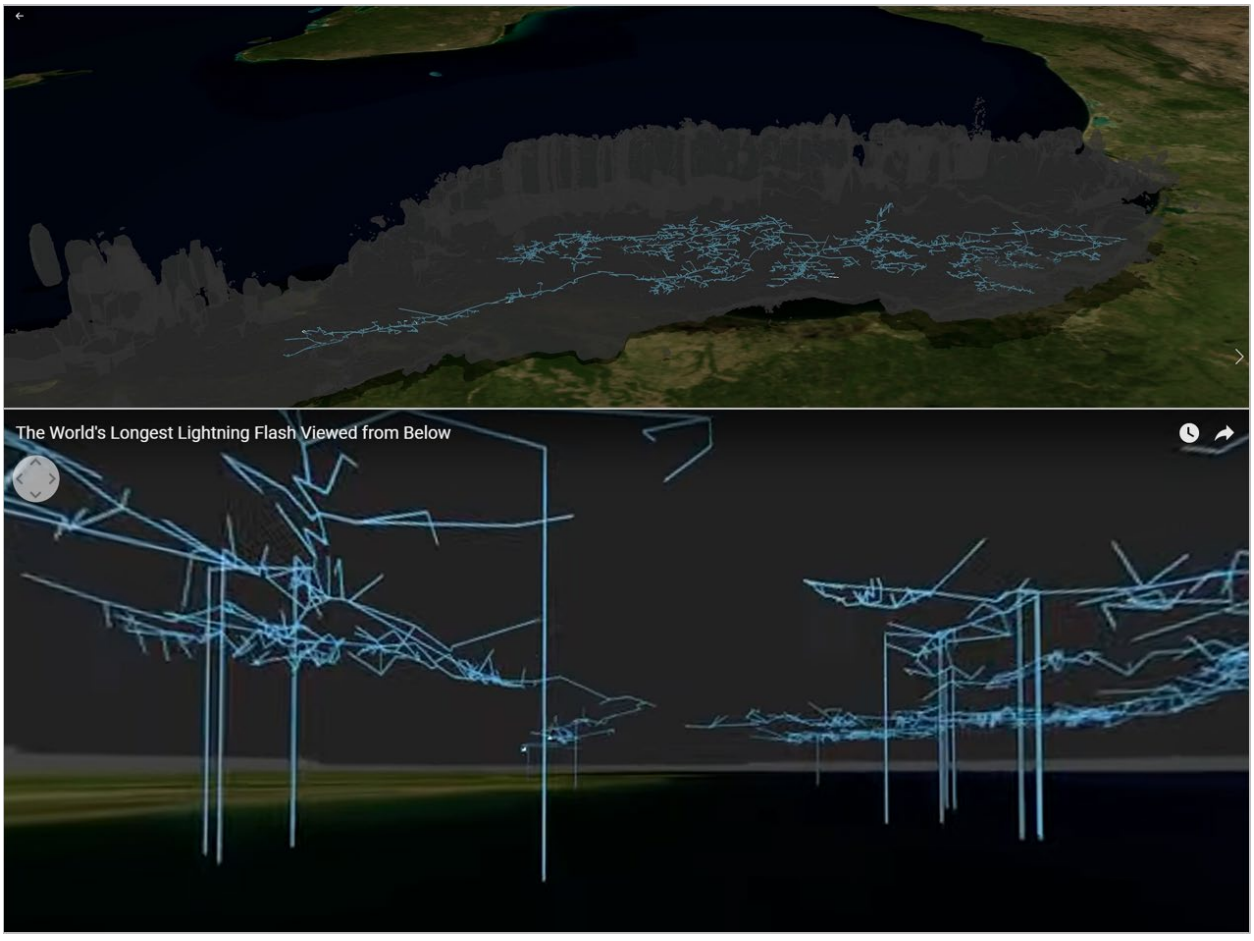
Figure: Trends in the annual mean sea-level pressure derived from four reanalysis datasets (NCEP/NCAR, ERA5, JRA55 and MERRA2) over the 1980-2020 time period. Colored circles present sea-level pressure trends at the station location calculated from in situ data. Large circles indicate statistically significant trends. Dashed green line indicates the annual mean position of the Antarctic Circumpolar Trough (ACT) as per ERA5 data.

Romanov, P. Yu., and N.A. Romanova, 2021: Sea-level pressure trends in the Southern Ocean and Antarctica from reanalysis and in situ data. *J. Oceanol. Res.*, **49**, 63–85, DOI: 10.29006/1564-2291.JOR-2021.49(4).3.

(*POC*: P. Romanov, peter.romanov@noaa.gov, Funding: JSTAR, JSTAR GCOM, METOP-SG & GOES-R AWG).

Media and Outreach

New GLM Story Map: The GLM team released a new ArcGIS Story Map via the NOAA GeoPlatform titled "Longest Lightning Flash Ever?" (https://arcg.is/0Pemqj0). This website provides stunning visualizations of a recently documented world record flash that covered a horizontal distance of 768 km (477.2 miles) on 29 April 2020. The document was prepared in response to the many inquiries received following this announcement, and seeks to share an important lightning safety message - "Lightning can strike ground anytime during the flash anywhere along its path". The page has been viewed over 1000 times in the first week.



(POC: S. Rudlosky, scott.rudlosky@noaa.gov , Funding: PDRA)