

SUPPLEMENTARY MATERIALS FOR

OBSERVATIONS OF THE UPPER OCEAN FROM AUTONOMOUS PLATFORMS DURING THE PASSAGE OF **EXTRATROPICAL CYCLONE EPSILON (2020)**

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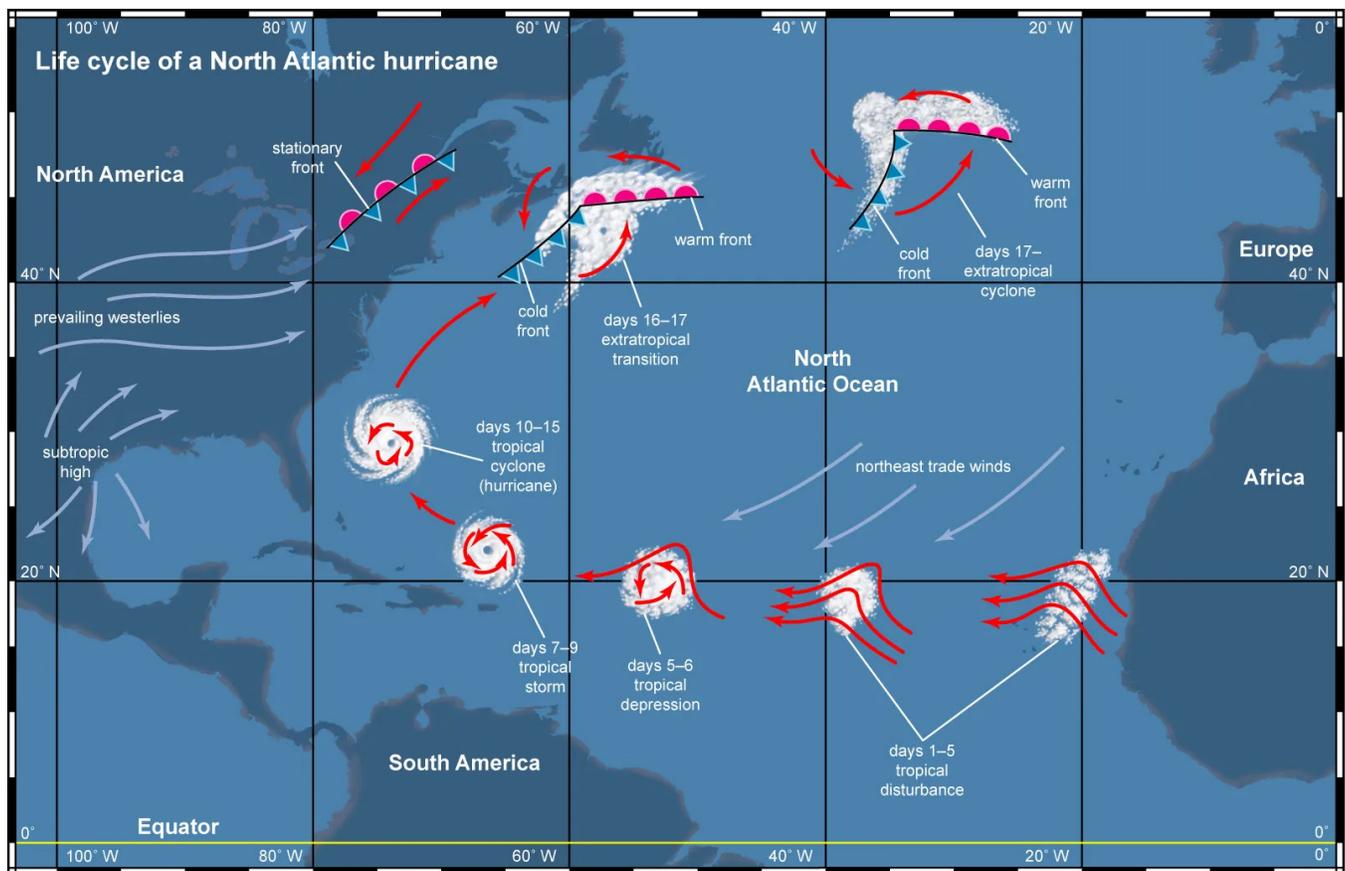


FIGURE S1. Typical life cycle of a North Atlantic hurricane, including transition to an extratropical cyclone. Figure from Flynn (2023).

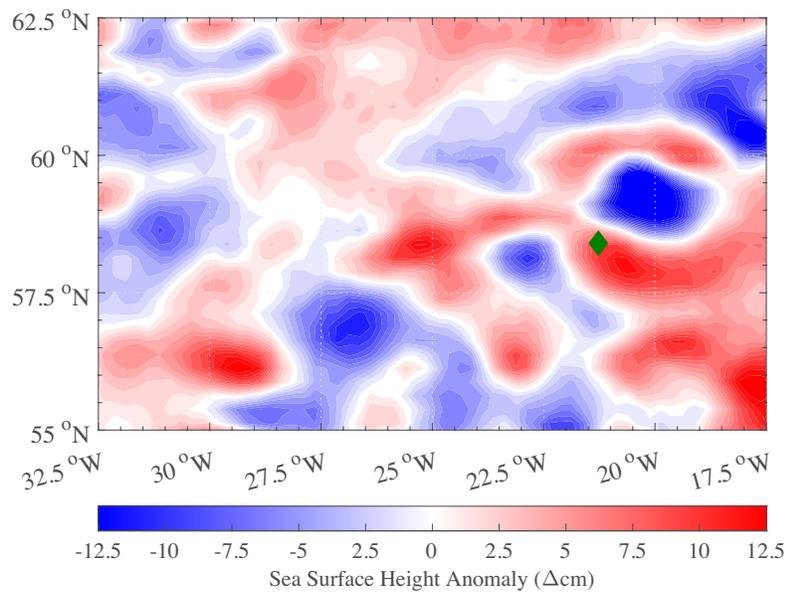


FIGURE S2. Sea surface height anomaly (Δcm) derived from NOAA satellite altimetry data (<https://coastwatch.noaa.gov/pub/socd/lisa/rads/sla/daily/nrt/2020/>) showing the anticyclonic PRIME eddy, the chosen deployment location for the Near Inertial Shear and Kinetic Energy in the North Atlantic Experiment (NISKINE) observational array (green diamond).

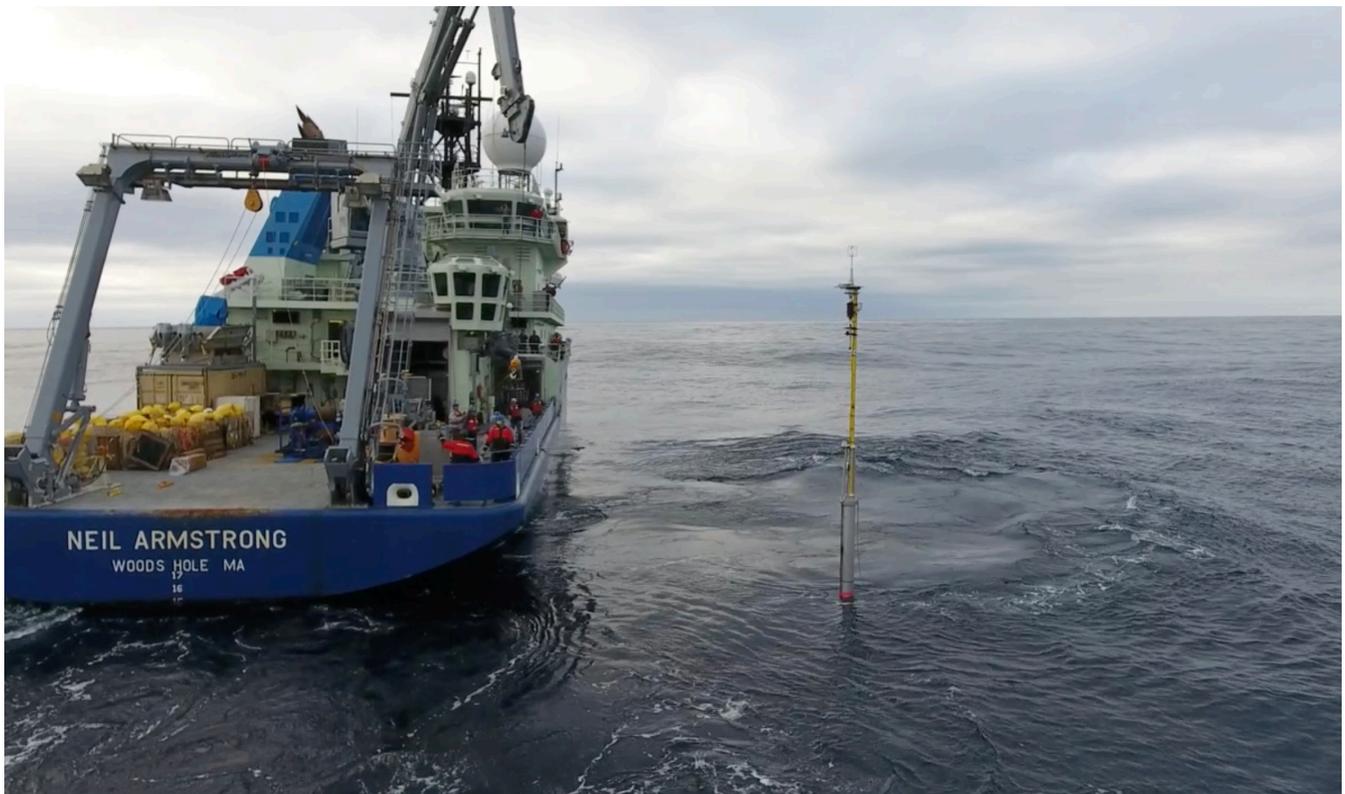


FIGURE S3. An eXpendable Spar buoy (X-Spar) drifting shortly after its deployment on October 4, 2020.



FIGURE S4. The Air-Launched Autonomous Micro Observer (ALAMO) float designed and manufactured by MRV Systems in collaboration with the Air-deployed Profiling Instruments Group at Woods Hole Oceanographic Institution.

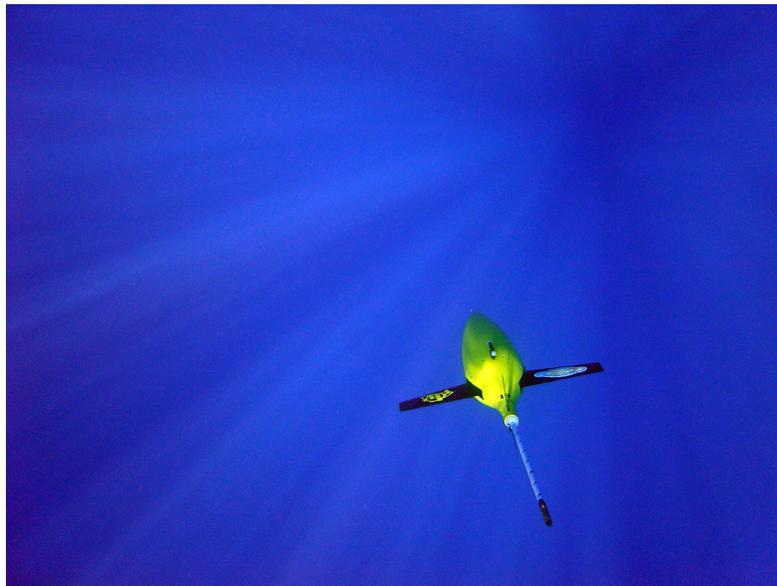


FIGURE S5. A Seaglider executing a dive cycle, which extends from the surface to as deep as 1,000 dbar. Endurance of these vehicles largely depends on the duration of the dive cycle and instrument sampling rates, but a nominal deployment time is over nine months. *Figure from University of Washington Applied Physics Laboratory*

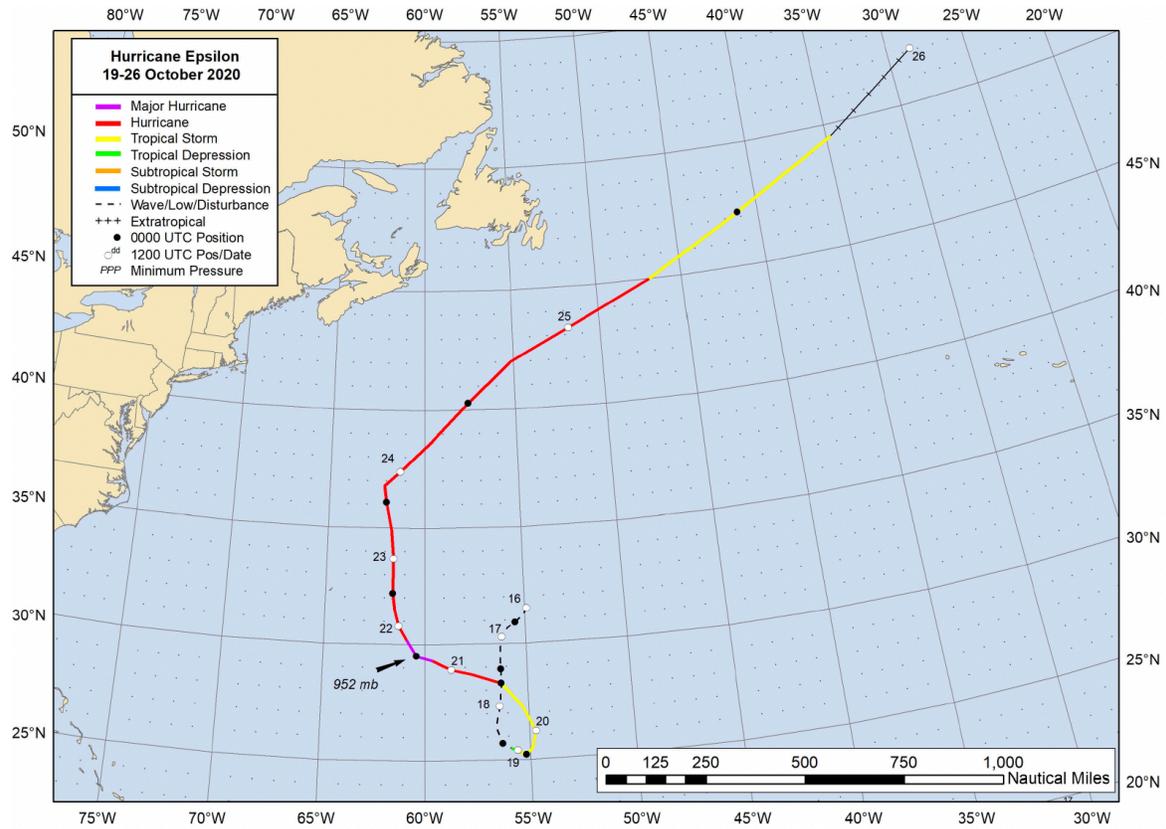


FIGURE S6. Best track positions for tropical cyclone/extratropical cyclone (TC/ETC) Epsilon from 1200 UTC October 16 to 1200 UTC October 26. *Figure from Papin (2020)*

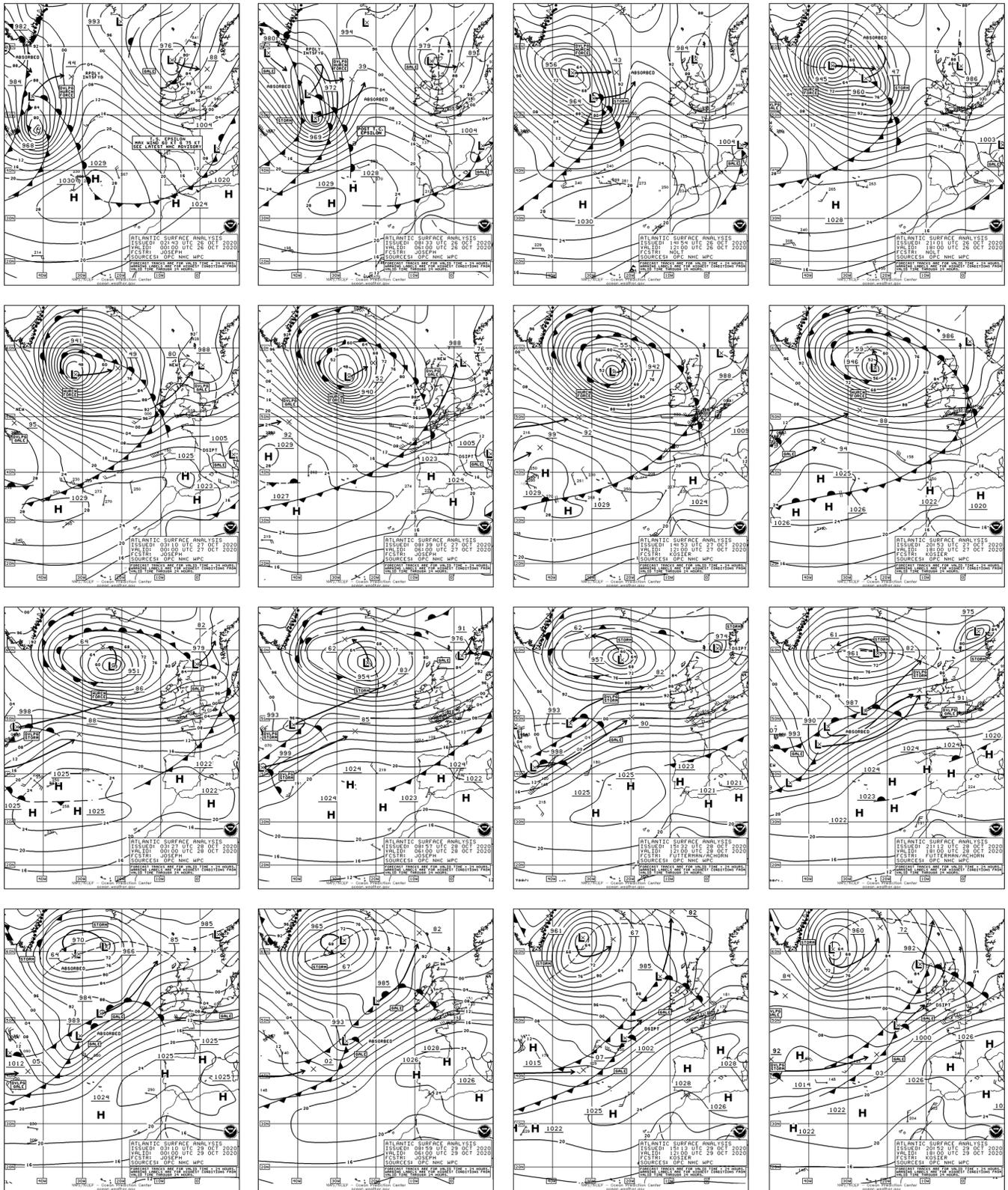


FIGURE S7. Atlantic surface analysis showing the approximate surface conditions in the North Atlantic every six hours from 0000 UTC October 26 to 1800 UTC October 29. Figures from NWS/NCEP OPC (<https://www.ncei.noaa.gov/data/ncep-charts/access/2020/10/>).

1200 UTC 27 October

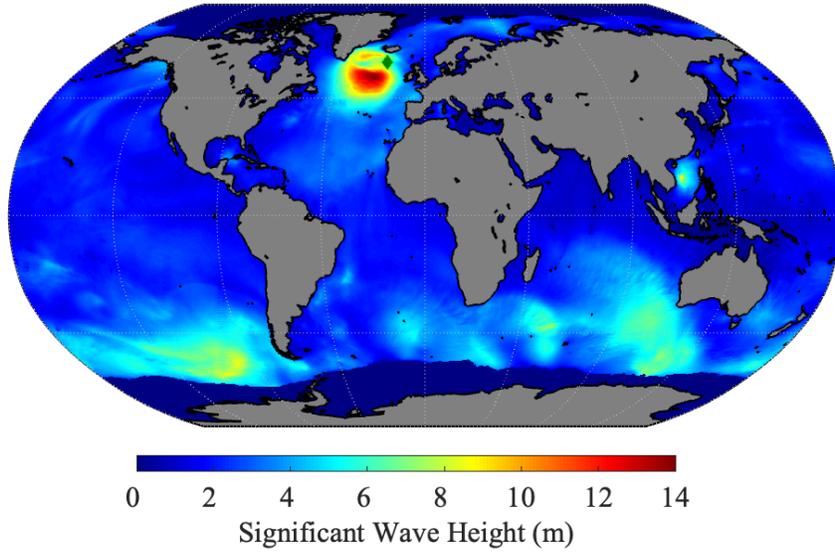


FIGURE S8. Global significant wave heights (m) at 1200 UTC October 27 highlighting the waves observed by the NISKiNe observational array (green diamond) as the largest in the world. *Data courtesy of the Mercator Océan International Global Ocean Waves Reanalysis product (<https://marine.copernicus.eu/>)*

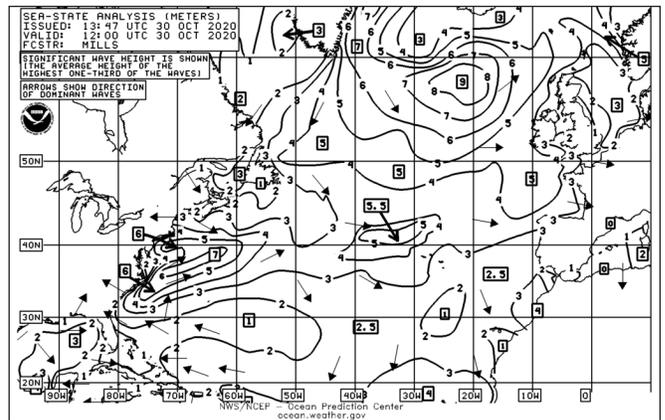
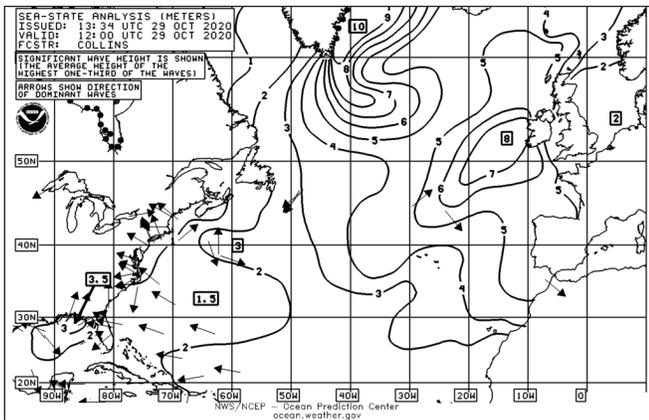
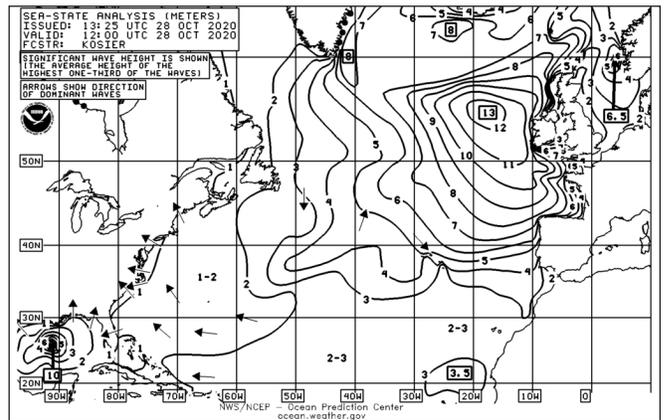
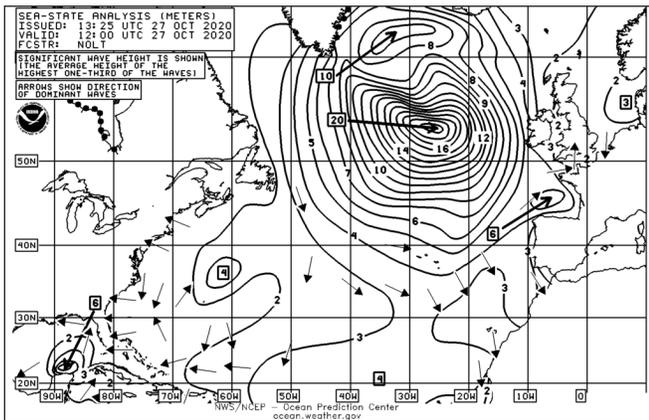
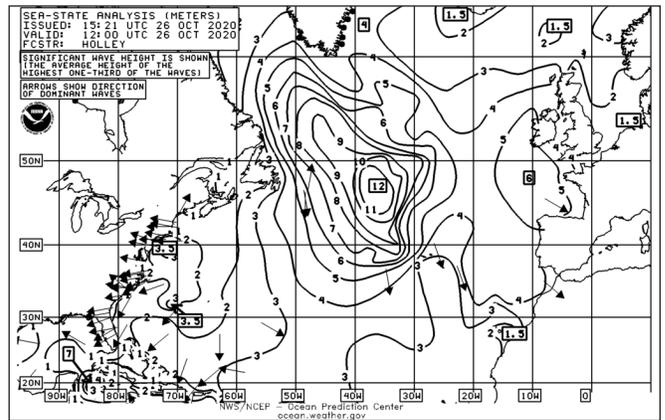
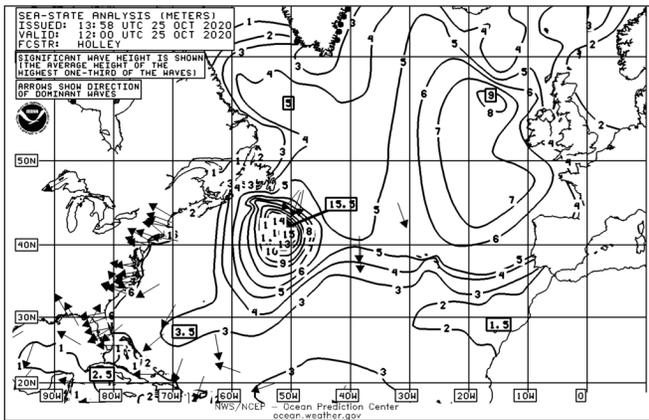


FIGURE S9. Atlantic sea-state analysis showing the approximate sea state in the North Atlantic every 24 hours from 1200 UTC October 25 to 1200 UTC October 30. Figures from NWS/NCEP OPC (<https://www.ncei.noaa.gov/data/ncep-charts/access/2020/10/>)

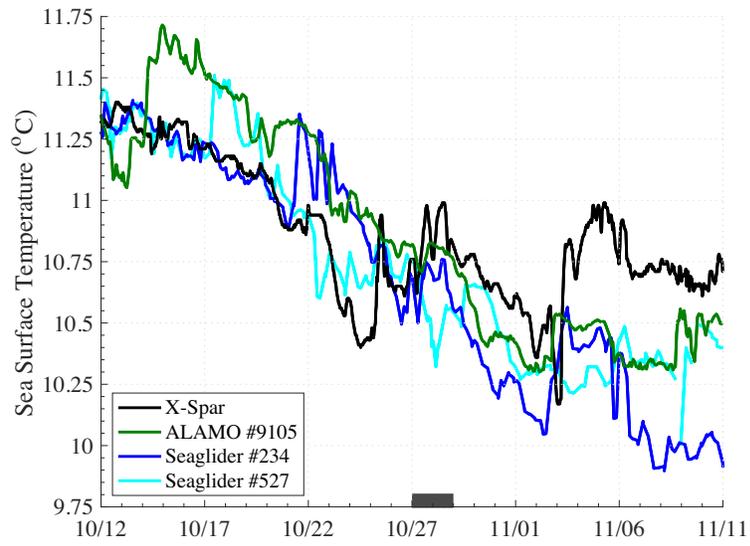


FIGURE S10. SSTs (°C) as observed by the NISKINE observational array: X-Spar (black), ALAMO #9105 (green), Seaglider #234 (blue), and Seaglider #527 (cyan) before, during (gray rectangle), and after the passage of ETC Epsilon.

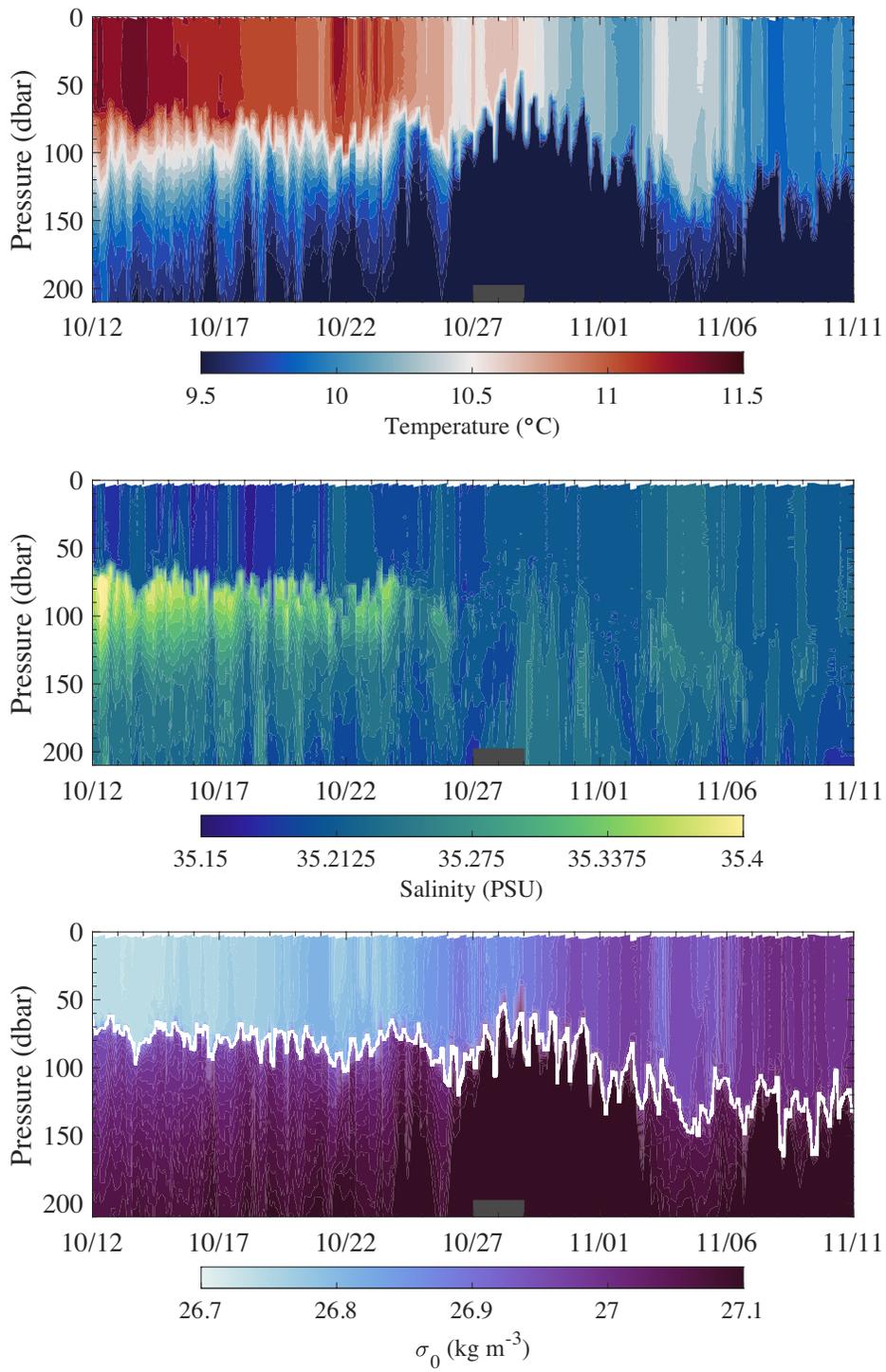


FIGURE S11. Seaglider #234 temperature (top; °C), salinity (middle; PSU), and potential density (bottom; $\sigma_0 = \rho_0 - 1,000 \text{ kg m}^{-3}$) records before, during (gray rectangle), and after the passage of ETC Epsilon.

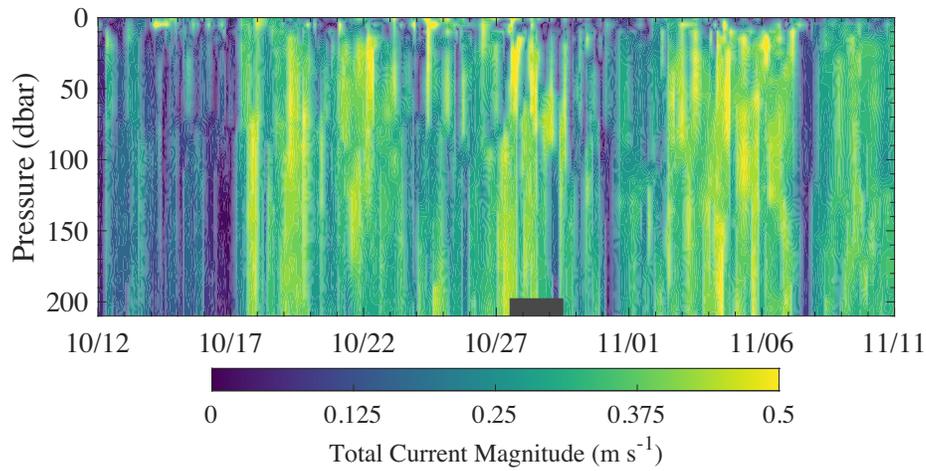


FIGURE S12. Total current magnitude (m s^{-1}), as calculated from observations by the acoustic Doppler current profiler (ADCP) onboard Seaglider #234 before, during (gray rectangle), and after the passage of ETC Epsilon.

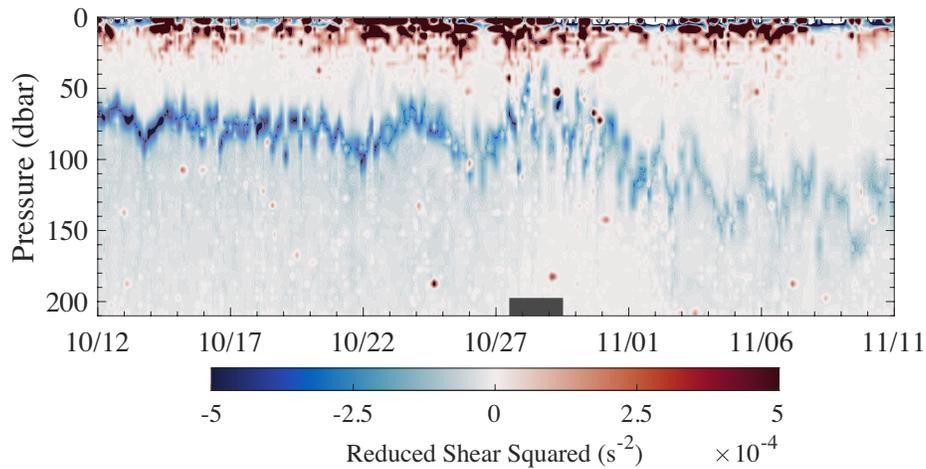
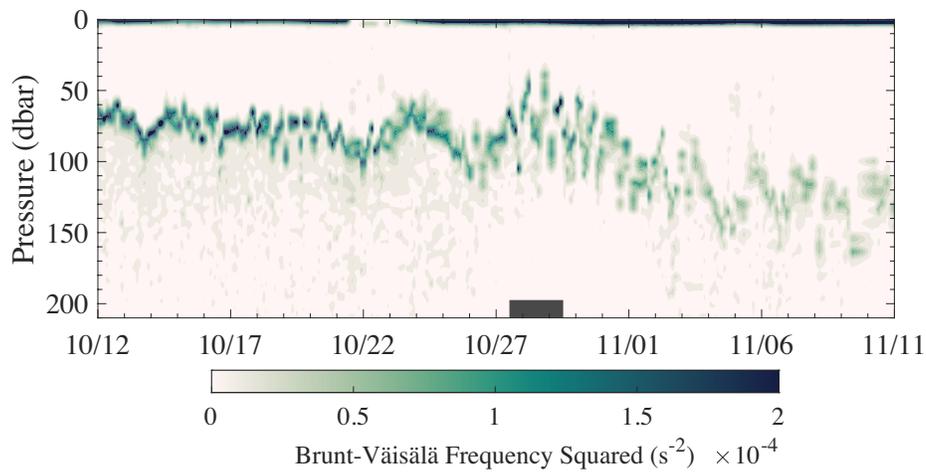


FIGURE S13. (top) Brunt-Väisälä frequency squared (s^{-2}), as calculated from observations by Seaglider #234 before, during (gray rectangle), and after the passage of ETC Epsilon. (bottom) Reduced shear squared ($S^2 - 4N^2$; s^{-2}), as calculated from observations by the ADCP onboard Seaglider #234 before, during (gray rectangle), and after the passage of ETC Epsilon. The three regimes plotted are (1) unstable (reds), (2) stable (blues), and (3) neutral (whites).

REFERENCES

- Flynn, D.J. 2023. *Mariner's Tropical Cyclone Guide*. Technical report, National Hurricane Center, National Weather Service, and National Oceanic and Atmospheric Administration, 86 pp., <https://www.nhc.noaa.gov/marinersguide.pdf>.
- Papin, P.P. 2020: *Tropical Cyclone Report: Hurricane Epsilon (AL272020)*. Technical report, National Hurricane Center, 23 pp. https://www.nhc.noaa.gov/data/tcr/AL272020_Epsilon.pdf.