



## The Gulf Stream Near the Rhumb Line Newport-Bermuda June 4, 2024 An Analysis of Conditions

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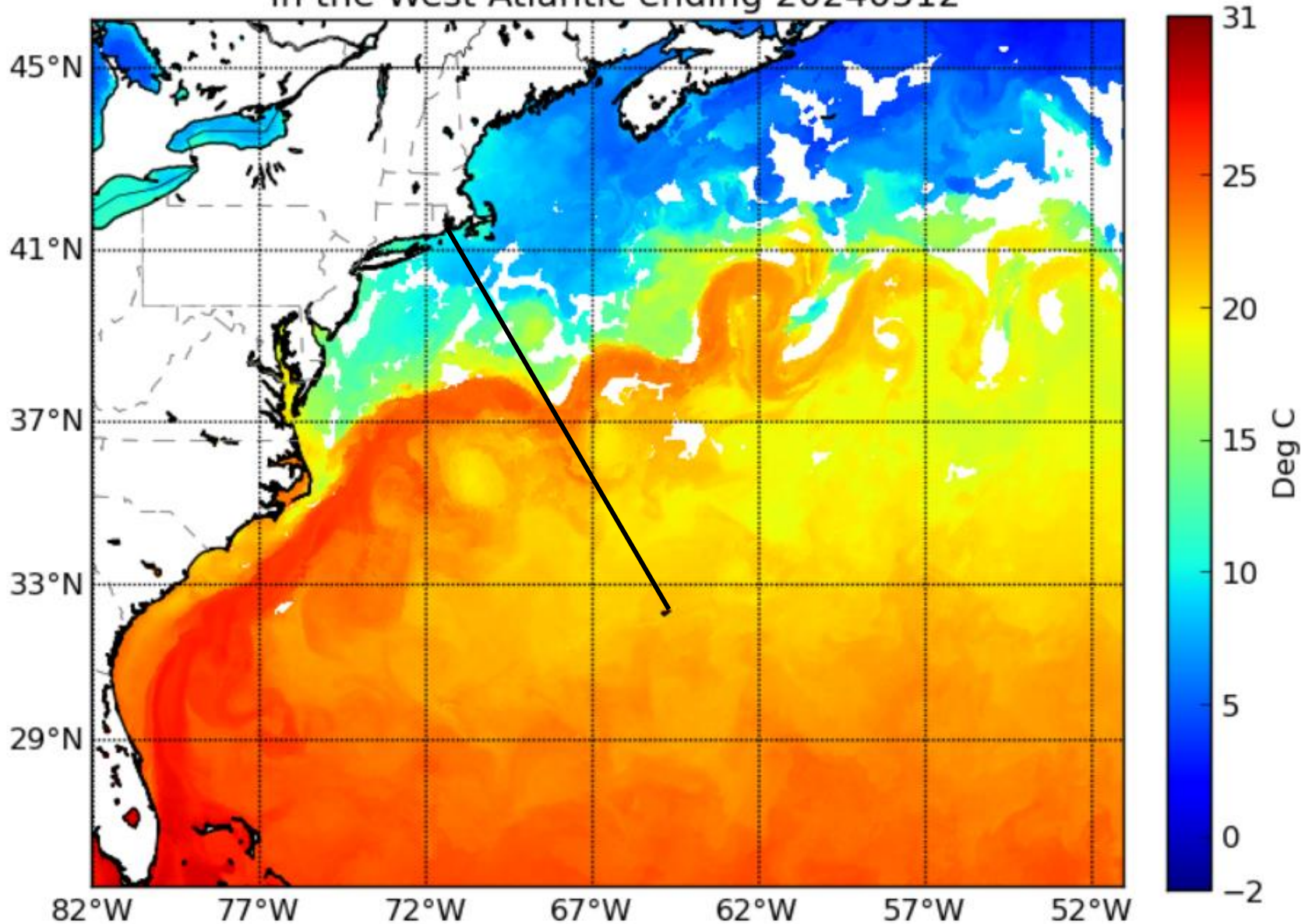
As we left the Gulf Stream in mid-May (see GS Note #1 May 13, 2024) satellite imagery of Sea Surface Temperatures (SST) showed a evident meander in the main body of the Stream straddling the rhumb line (Fig.1). The resulting flow crossed the rhumb line at near right angles near  $37^{\circ} 30' N$ . Over the next week or so this feature evolved into a series of smaller scale disturbances resulting in a more nearly linear north wall of the Stream with flows still crossing the rhumb line at a near right angle but a bit further north near  $38^{\circ} N$  (Fig.2). The Mercator Ocean model shows currents through May 28<sup>th</sup> to be nearly west to east with minimal meandering (Fig.3) This rapid evolution in Stream structure is consistent with that observed earlier in the season and may represent the new “normal” in Gulf Stream behavior. This is an important factor to keep in mind when developing a Stream crossing strategy.

This supposition is further supported by the time series views of the Stream over the past week or so. Both the four- day composite provided by the Ocean Prediction Center (Fig.4) and the satellite composite of SST from Rutgers (<http://rucool.marine.rutgers.edu>) (Fig.5) show the development of an evident meander to the west of the rhumb line between May 30 and June 4<sup>th</sup>. This feature deepened rapidly with some regression or migration to the west possible. Associated flows again crossed the rhumb line at a near right angle from the southwest to the northeast near  $38^{\circ} N$ . The Mercator Ocean model provides a reasonably similar simulation of the evolution in thermal structure (Fig.6) and the associated development of a meandering flow pattern in this short time (Fig.7). This short response is quite different than that encountered in previous Newport Bermuda Races.

Coincident with the evolution in the form and location of the main body of the Stream, a progressive drift to the west, counter to the mean northeasterly flow in the main body, in the region south of the main body has resulted in some significant changes in the flow field affecting the course to Bermuda. The altimetry based model of currents (Fig.8) shows the counterclockwise rotating cold core ring which in mid-May was centered near  $36^{\circ} 30' N 67^{\circ} W$ , well east of the rhumb line, now centered slightly west of the rhumb line near  $36^{\circ} N 67^{\circ} 30' W$ . This drift of approximately 60nm over 22 days implies an average of approximately 3nm/day. Continuing until the start of the Race on June 21 and probable arrival to the area of the ring on the 23<sup>rd</sup> this drift should bring the 120nm diameter ring clear to the west of the rhumb line resulting in relatively minor adverse current along the track to Bermuda. Since a slower drift could result in adverse currents equal to or slightly more than 3 knots along the rhumb line this feature warrants careful monitoring over the next few weeks.

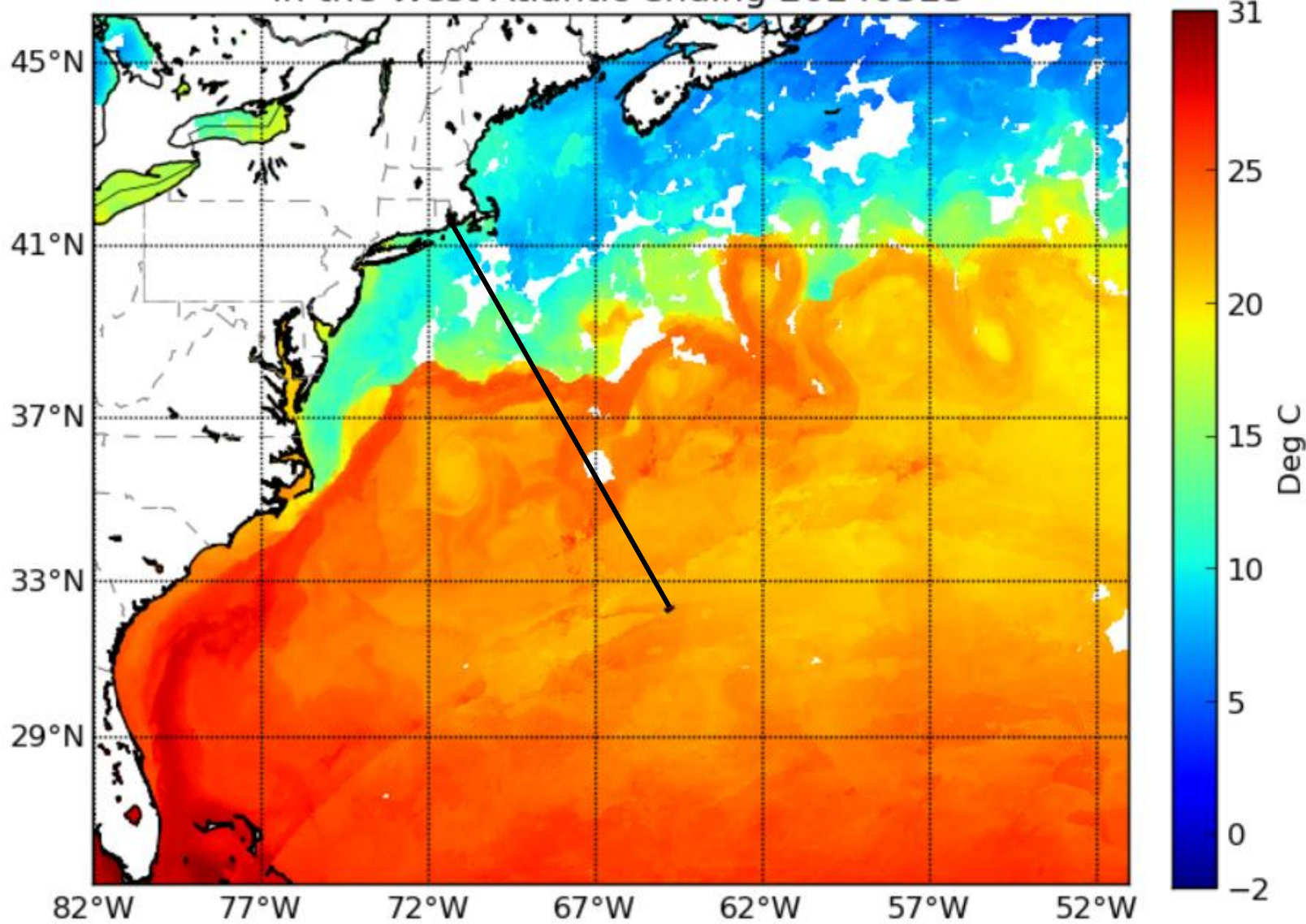
Further south, the cold core feature which was centered slightly to the east of the rhumb line in mid-May has also drifted to the west but more slowly than the northern ring and is now centered near  $34^{\circ}\text{N } 66^{\circ}\text{W}$  on the rhumb line (Fig.8). At present, this ring's counterclockwise flow has a relatively small effect on the optimum route. This relationship is likely to change by June 21.

GOES SST 4 Day Most Recent Composite  
in the West Atlantic ending 20240512

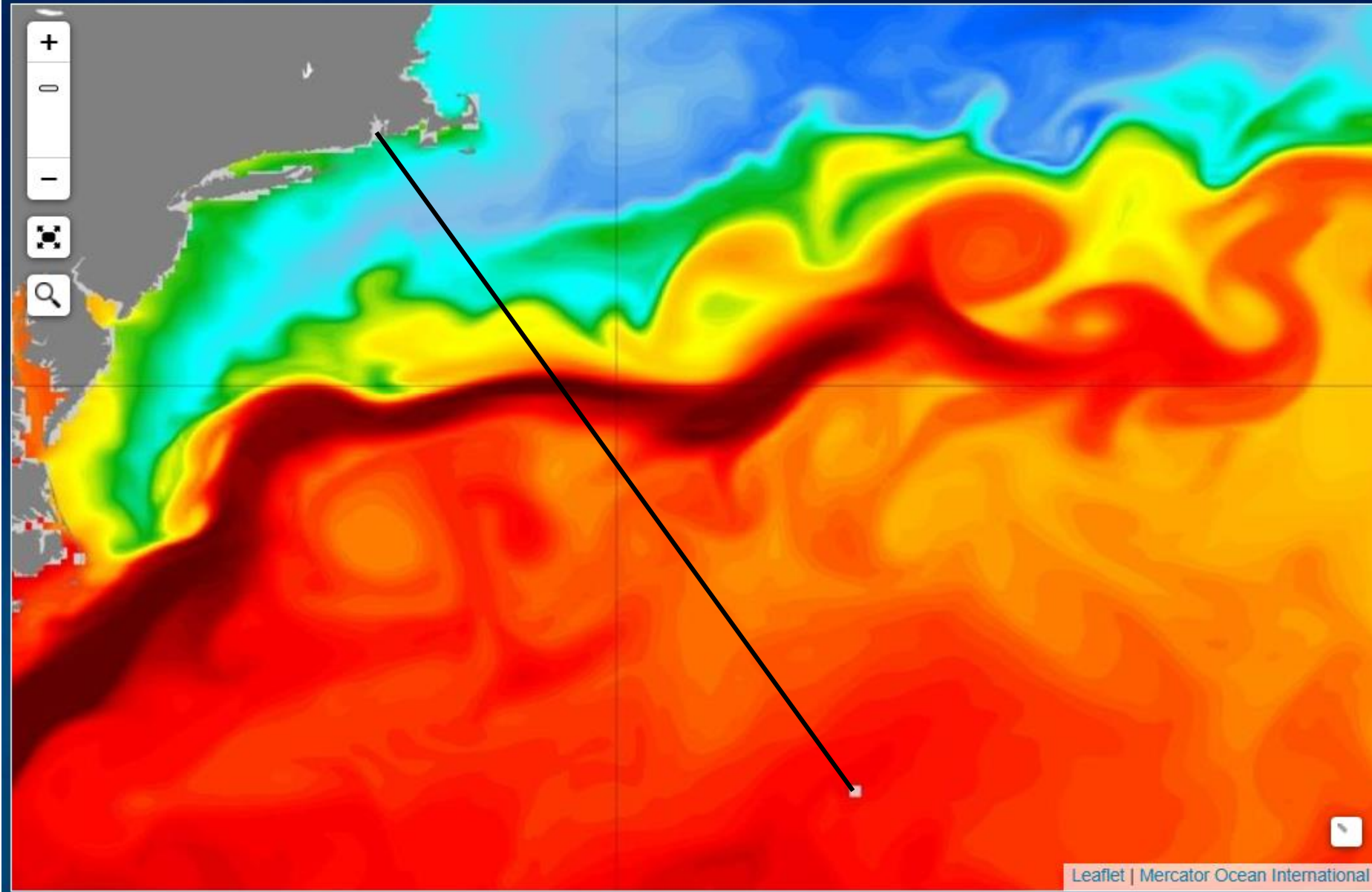


**Figure 1** Ocean Prediction Center Gulf Stream 4-Day Composite SST Image  
Black Line Represents The Newport To Bermuda Rhumb Line

GOES SST 4 Day Most Recent Composite  
in the West Atlantic ending 20240523

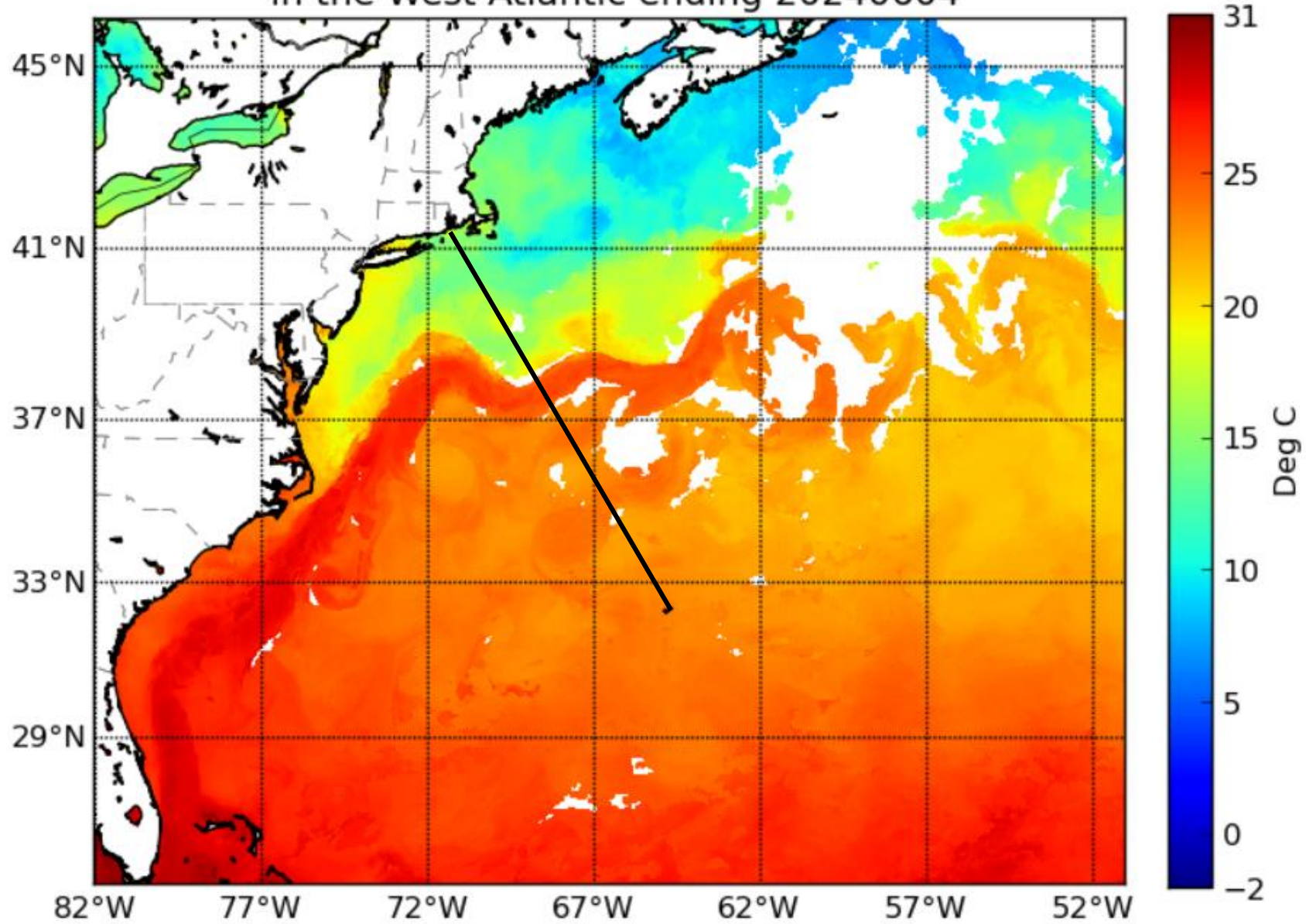


**Figure 2** Ocean Prediction Center Gulf Stream 4-Day Composite SST Image  
Black Line Represents The Newport To Bermuda Rhumb Line



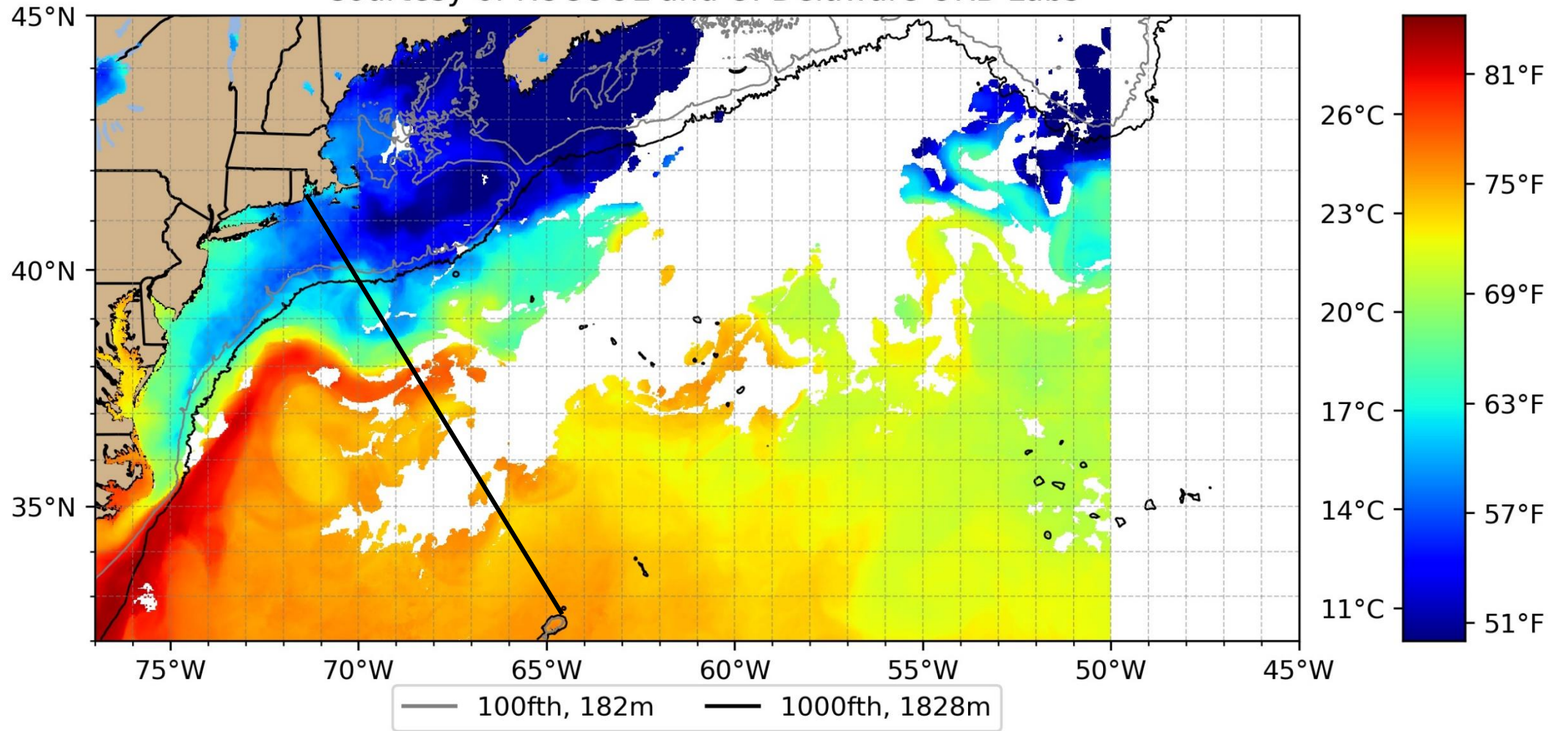
**Figure 3** Mercator Ocean Computed Sea Surface Temperatures May 28, 2024  
Black Line Represents The Newport to Bermuda Rhumb Line

GOES SST 4 Day Most Recent Composite  
in the West Atlantic ending 20240604

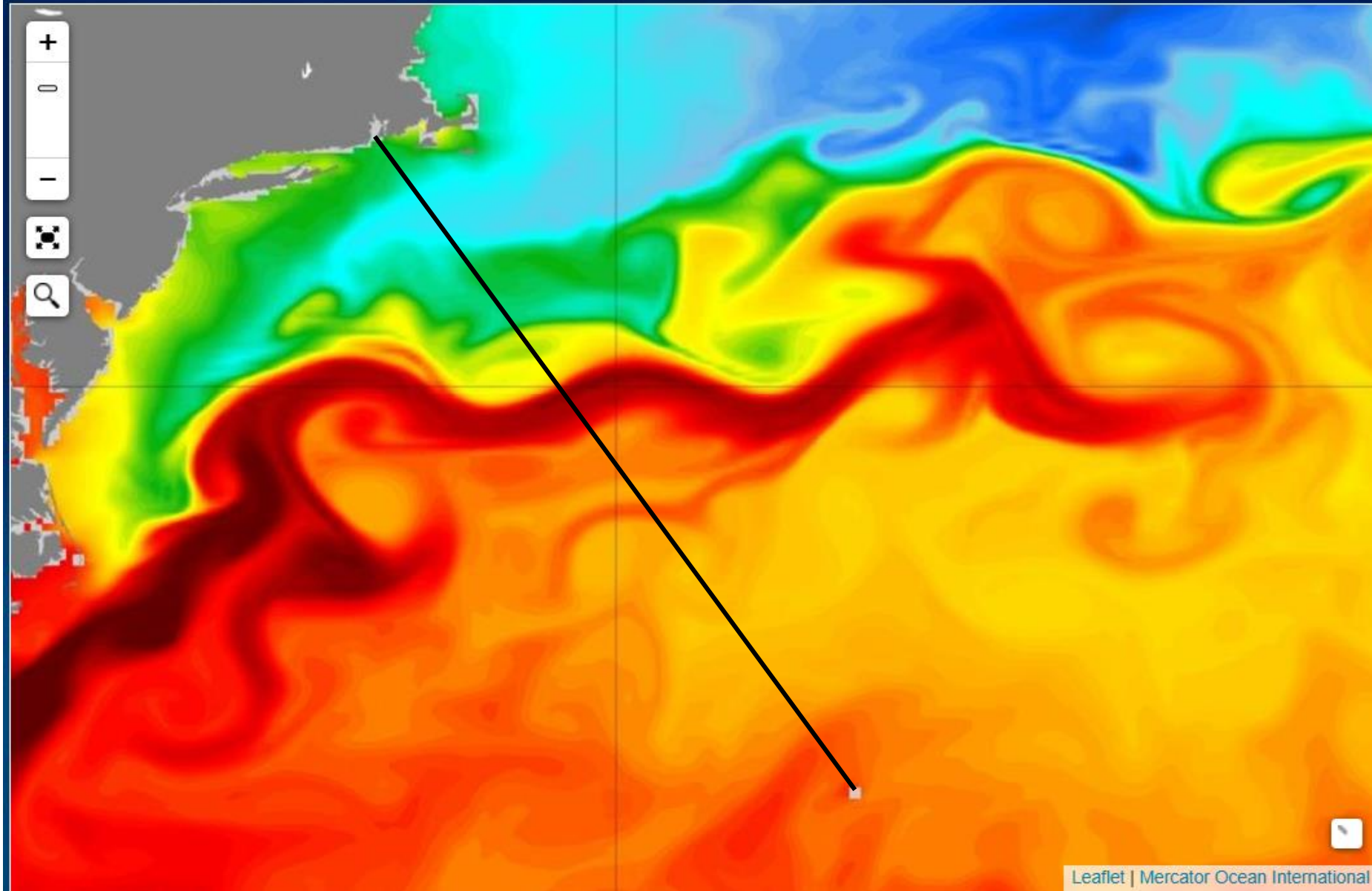


**Figure 4** Ocean Prediction Center Gulf Stream 4-Day Composite SST Image  
Black Line Represents The Newport To Bermuda Rhumb Line

GOES Sea Surface Temperature 24-hr Composite: May 30 2024 1800 GMT  
Courtesy of RUCOOL and U. Delaware ORB Labs

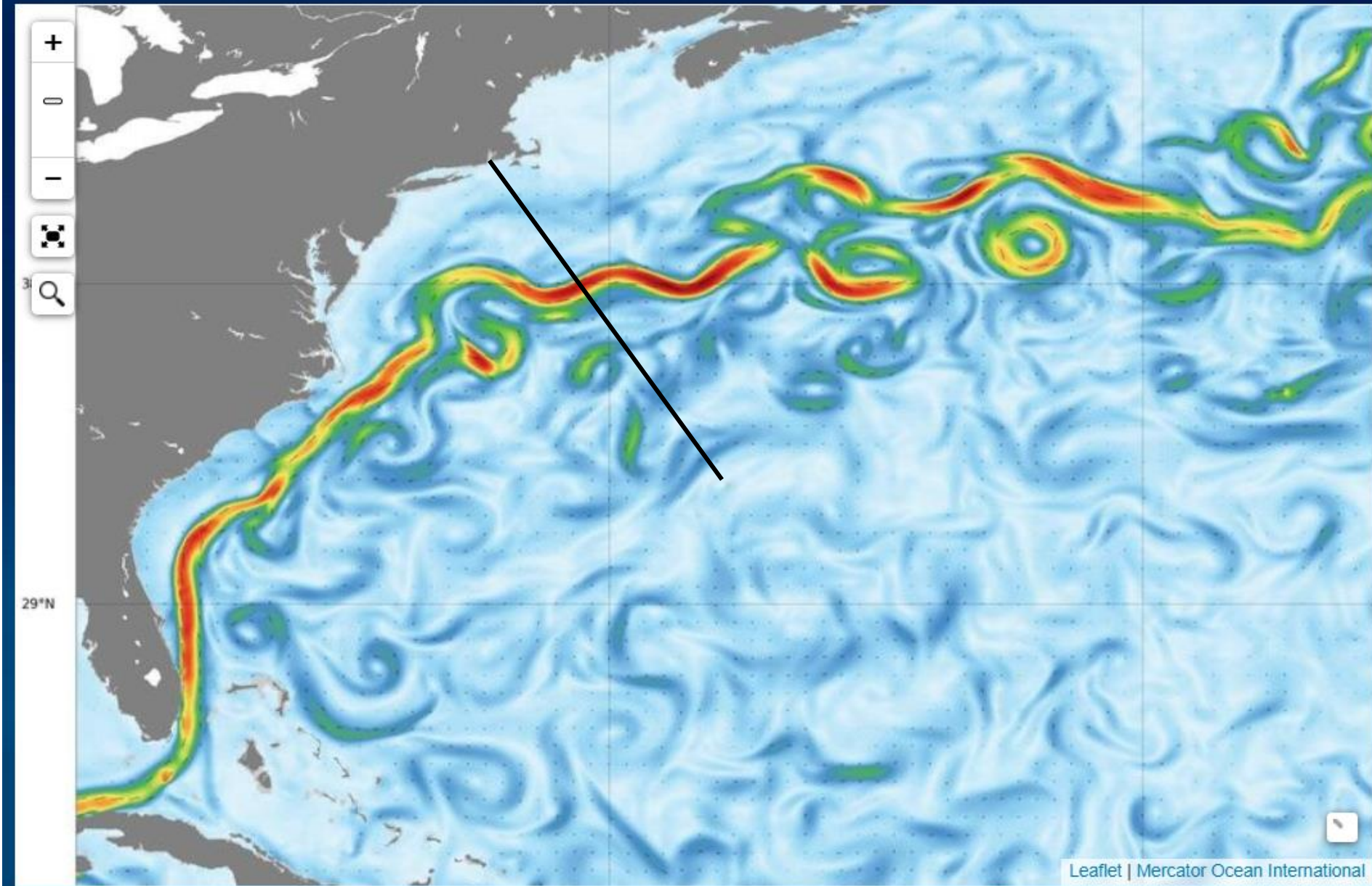


**Figure 5 Gulf Stream Sea Surface Temperatures May 30, 2024**  
**Black Line Represents Newport to Bermuda Rhumb Line**

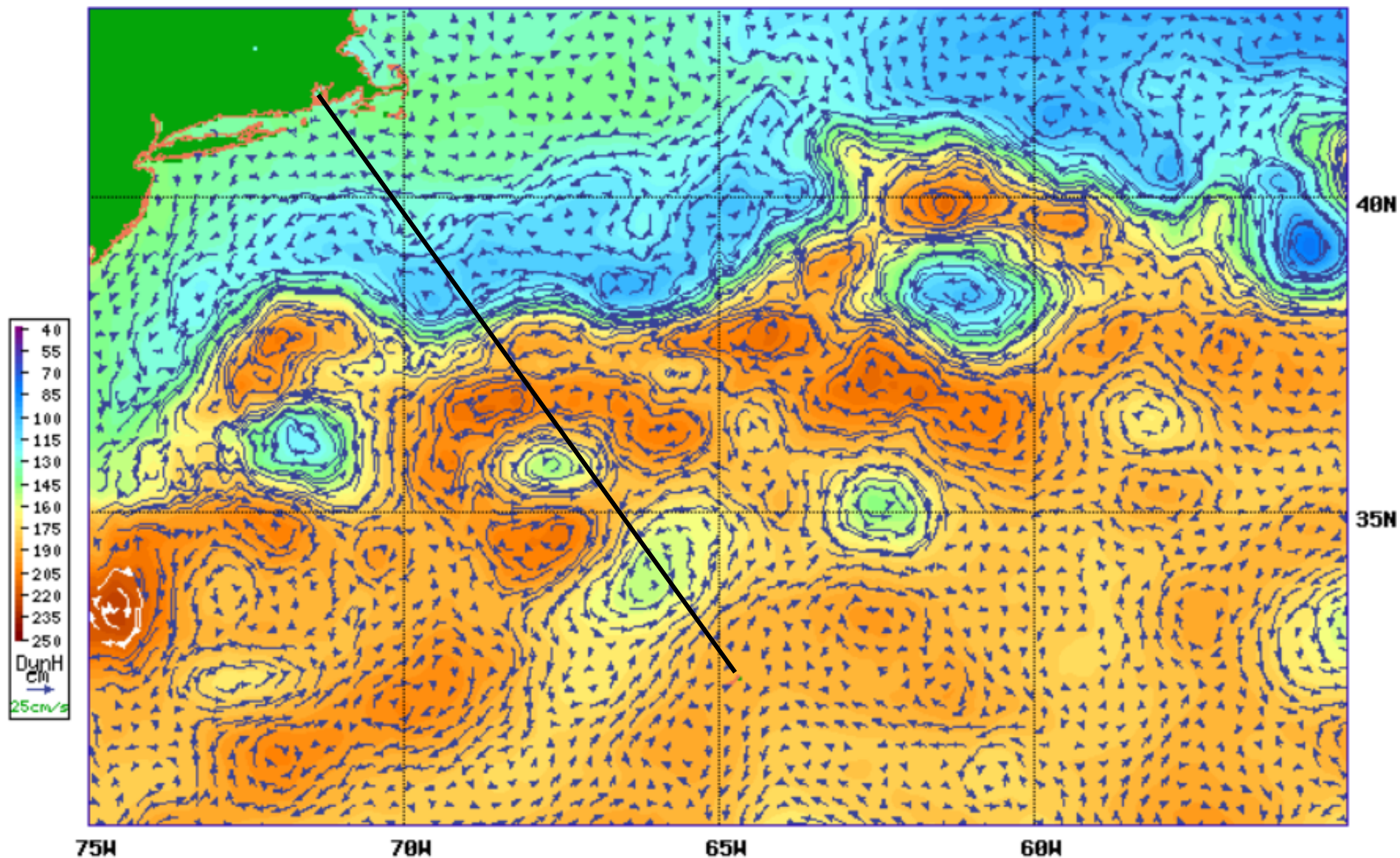


**Figure 6** Mercator Ocean Computed Sea Surface Temperatures June 4, 2024  
Black Line Represents The Newport to Bermuda Rhumb Line





**Figure 7** Mercator Ocean Computed Surface Currents - Gulf Stream - June 4, 2024  
Black Line Represents The Newport to Bermuda Rhumb Line



**Figure 8 Northwest Atlantic Surface Currents- Altimetry Based Model June 4, 2024**  
**Black Line Represents The Newport to Bermuda Rhumb Line**