



Forecasting the

*Witch of November*

A POST EVENT RE-ANALYSIS OF 9-10 NOVEMBER 1975

The background of the slide is a grayscale image of a large ship, possibly a research vessel or a cargo ship, navigating through a very rough and stormy sea. The ship is tilted slightly to the left, and its upper decks and masts are visible against a dark, overcast sky. The water is churning with white-capped waves, suggesting high winds and heavy weather conditions. The overall tone is somber and dramatic, emphasizing the severity of the storm being discussed.

Using...

# **A High-Resolution Atmospheric Simulation of the 9-10 November 1975 “Edmund Fitzgerald” Storm**

2003 U.S./Canada Great Lakes Operational Meteorology Workshop  
London, Ontario  
3 October 2003

Tom Hultquist  
Science & Operations Officer  
National Weather Service  
Marquette, MI



The background of the slide is a dramatic, low-key photograph of a large ship, the Edmund Fitzgerald, navigating through a turbulent sea with high, white-capped waves. The ship is white with a dark red hull, and its name "EDMUND FITZGERALD" is visible on the side. A bright beam of light from a searchlight on the ship's deck illuminates the scene. In the distance, another ship is visible, emitting a thick plume of dark smoke from its funnel. The overall atmosphere is one of a severe weather event.

and...

# **ECMWF ERA5 Historical Model Reanalysis Data for 9 Nov – 11 Nov 1975.**

Created with MetPy's Meteorological Package for Python

# *When the skies of November turn gloomy*

- November is known for rough conditions on the Great Lakes.
- More wrecks have occurred in November than any other month
- Over 6000 shipwrecks in the Great Lakes
- Over 30,000 mariners lost



# *Pride of the American Side*

June 7<sup>th</sup>, 1958

River Rouge, Michigan

728ft bow to stern



# *Pride of the American Side*

Hauled taconite iron ore pellets & coal from Superior, Wisconsin to Toledo, Ohio

Average load was 24-26k tons

Set numerous records for load size



*Comin' back from some mill in Wisconsin...*

9 Nov 1975

Left Superior Wisconsin at  
2:20pm

Headed downbound for Detroit

Load of 26,116 tons of Taconite

Captain Ernest McSorley  
(since 1972)

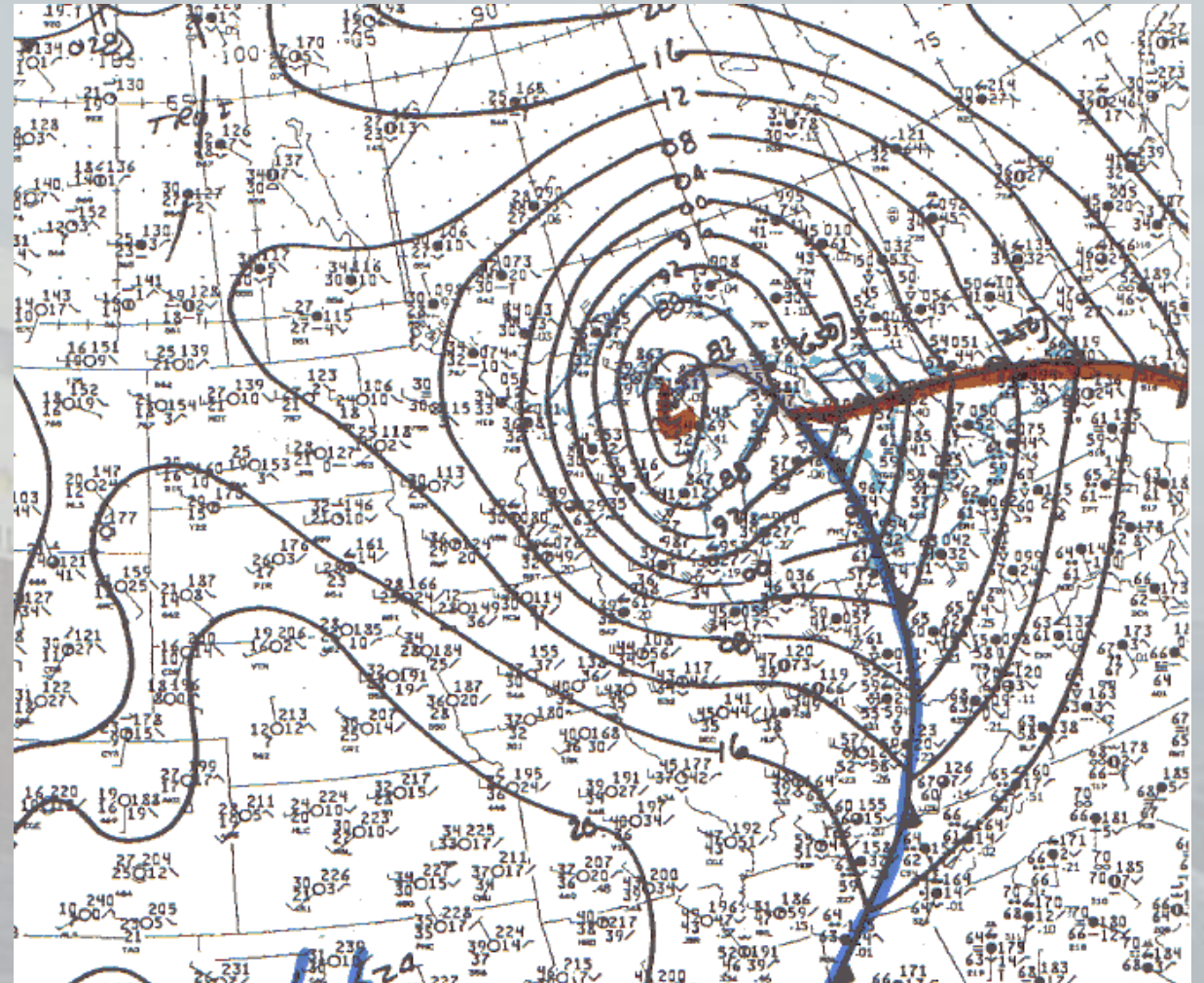




*Could it be the north wind they'd been feelin'?*

The NWS issues Gale Warnings for all of Lake Superior at 3:39pm Nov. 9, 1975

The NWS upgrades to Storm Warnings for all of Lake Superior at 2:00am Nov. 10, 1975





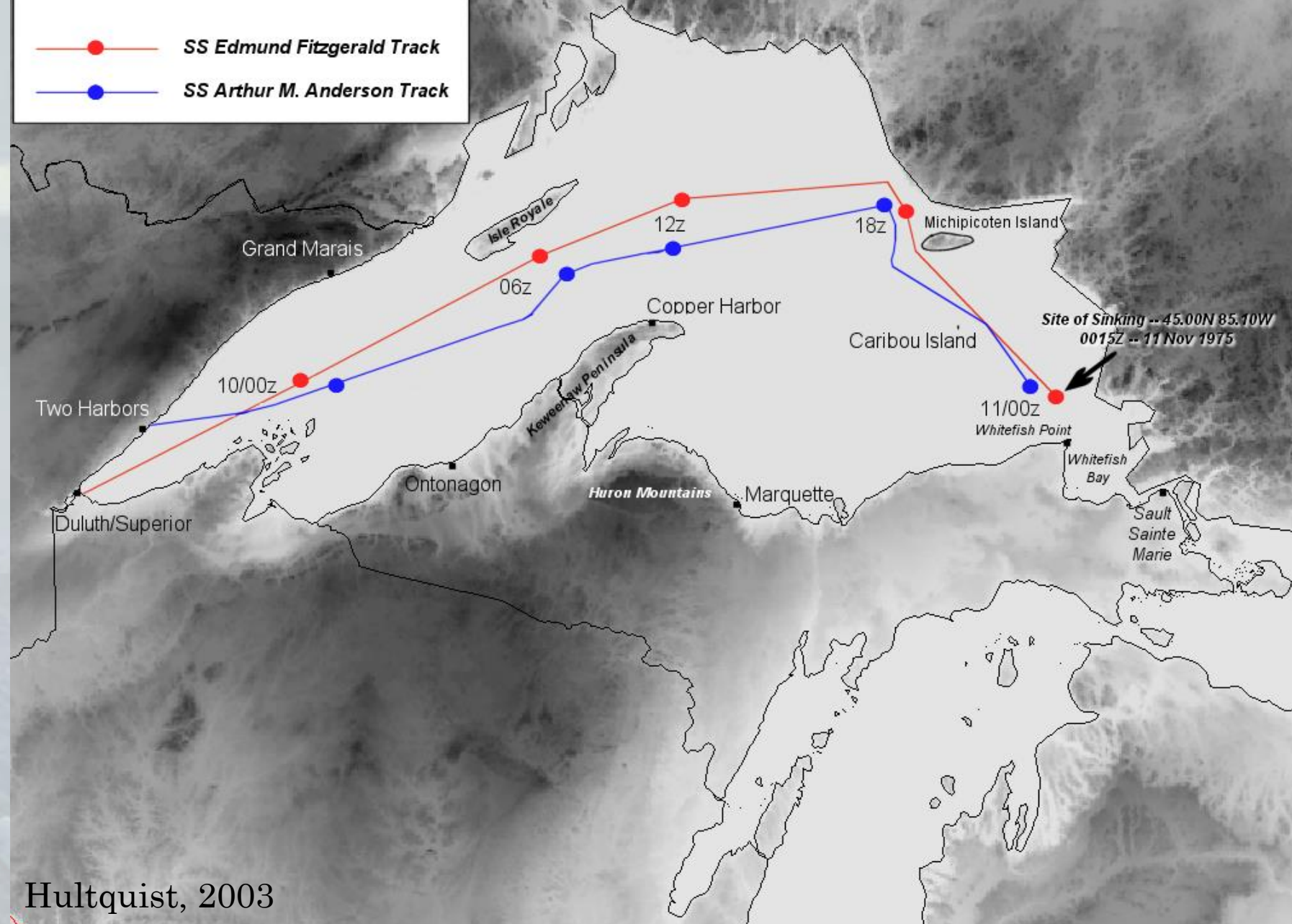
12z 10 Nov 1975 – true sfc analysis (Hultquist, 2003)



**The Final Voyage of the SS Edmund Fitzgerald**

**09-11 November 1975**

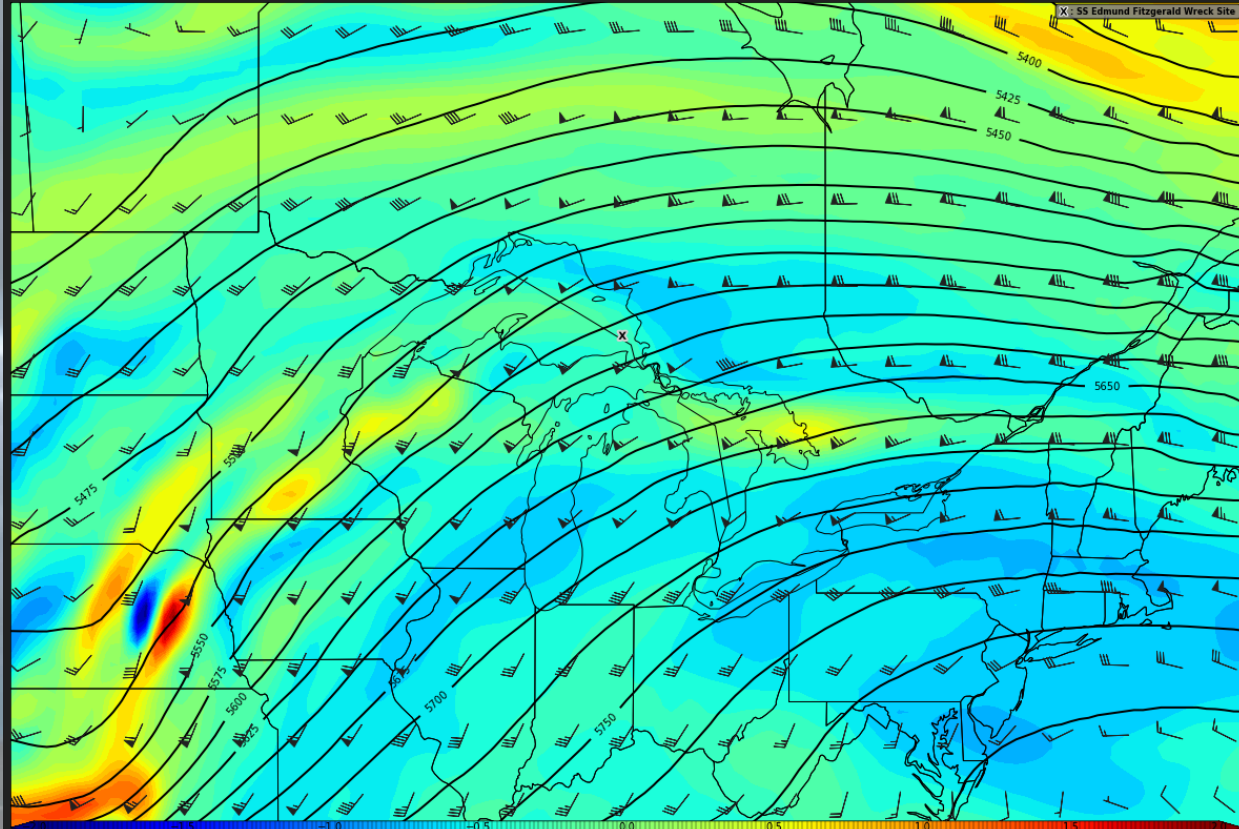
-  **SS Edmund Fitzgerald Track**
-  **SS Arthur M. Anderson Track**





Historical Event Reanalysis: The Wreck of The Edmund Fitzgerald  
ERA-5 Reanalysis | 500 hPa Height (m), Absolute Vorticity (10/s), Wind (kt)

18Z | SUN NOVEMBER 09, 1975



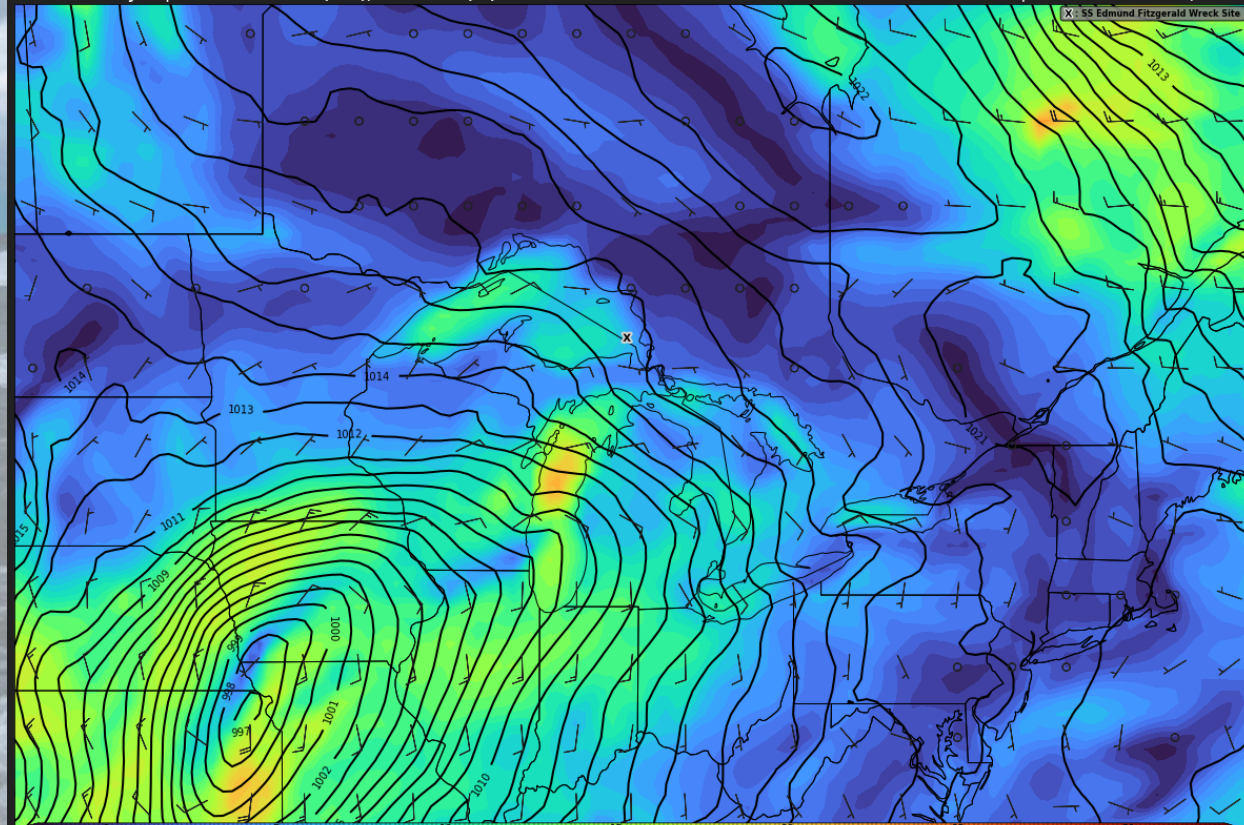
ERA-5 Historical Reanalysis courtesy ECMWF | VALID: 11 / 09 / 1975 18z | CREATED: 10 / 30 / 2022 - 23:27:13z

Kyle Gillett (@wxkylegillett) - Powered by MetPy

500hPa (left), Sfc (right)  
18z 9 Nov 1975 [1pm 11/9]

Historical Event Reanalysis: The Wreck of The Edmund Fitzgerald  
ERA-5 Reanalysis | Surface Pressure (hPa), 10m Wind (kt)

18Z | SUN NOVEMBER 09, 1975



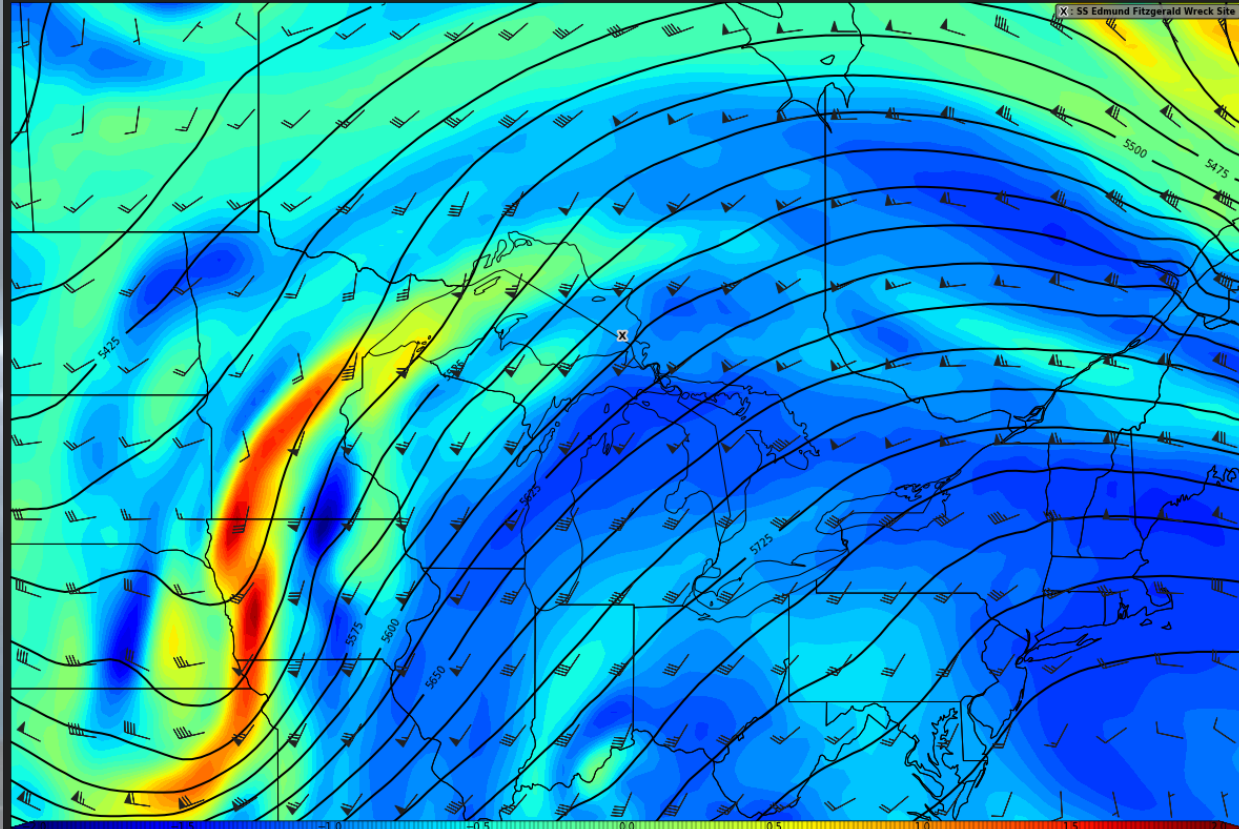
ERA-5 Historical Reanalysis courtesy ECMWF | VALID: 11 / 09 / 1975 18z | CREATED: 10 / 30 / 2022 - 23:31:17z

Kyle Gillett (@wxkylegillett) - Powered by MetPy



Historical Event Reanalysis: The Wreck of The Edmund Fitzgerald  
ERA-5 Reanalysis | 500 hPa Height (m), Absolute Vorticity (10/s), Wind (kt)

00Z | SUN NOVEMBER 10, 1975



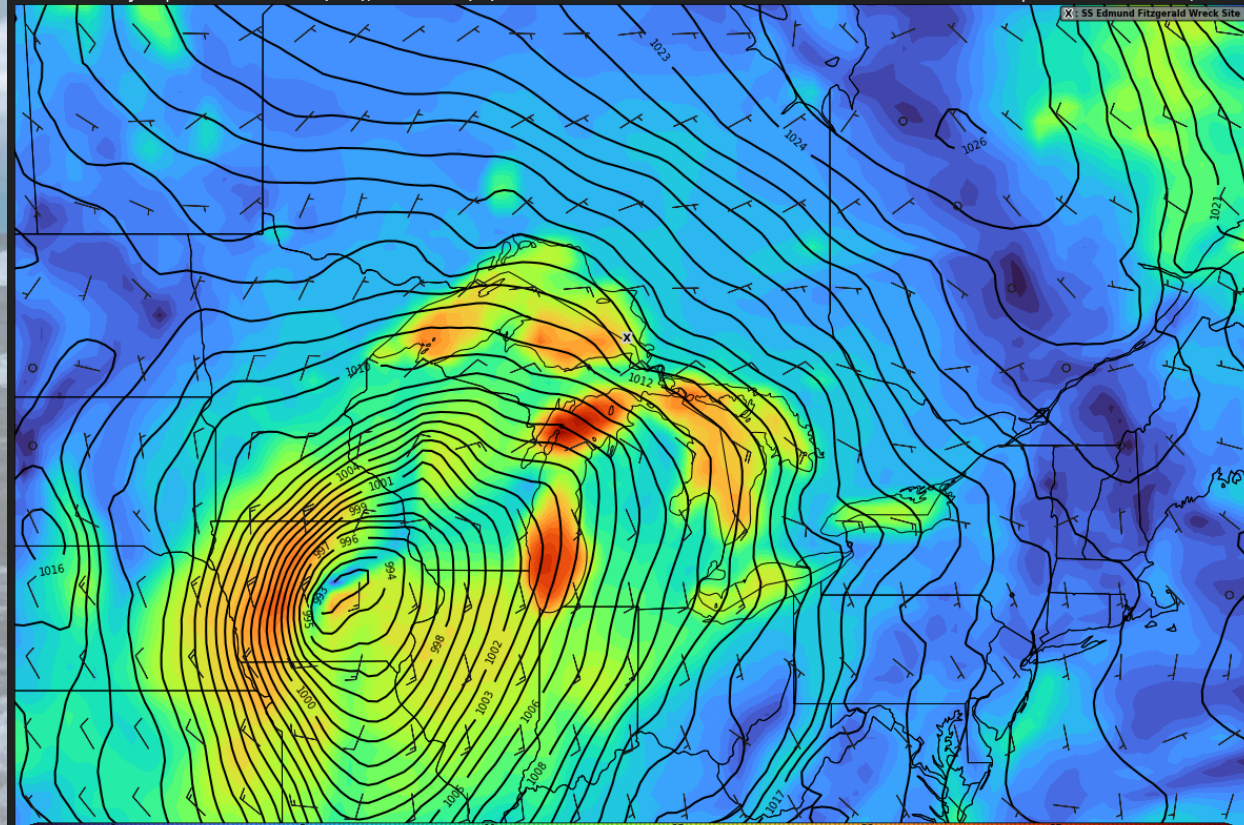
ERA-5 Historical Reanalysis courtesy ECMWF | VALID: 11 / 10 / 1975 00z | CREATED: 10 / 30 / 2022 - 01:08:41z

Kyle Gillett (@wxkylegillett) - Powered by MetPy

500hPa (left), Sfc (right)  
00z 10 Nov 1975 [7pm 11/9]

Historical Event Reanalysis: The Wreck of The Edmund Fitzgerald  
ERA-5 Reanalysis | Surface Pressure (hPa), 10m Wind (kt)

00Z | SUN NOVEMBER 10, 1975



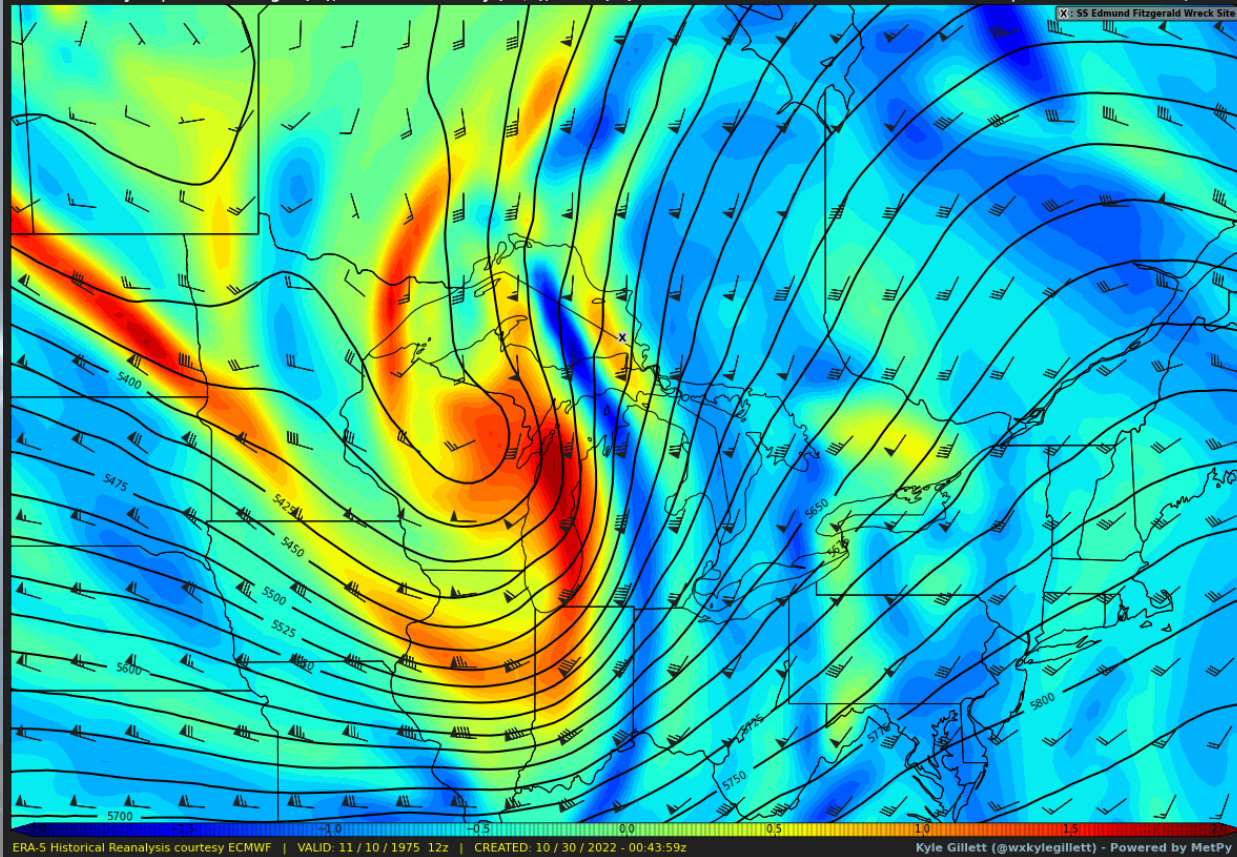
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Kyle Gillett (@wxkylegillett) - Powered by MetPy



Historical Event Reanalysis: The Wreck of The Edmund Fitzgerald  
ERA-5 Reanalysis | 500 hPa Height (m), Absolute Vorticity (10/s), Wind (kt)

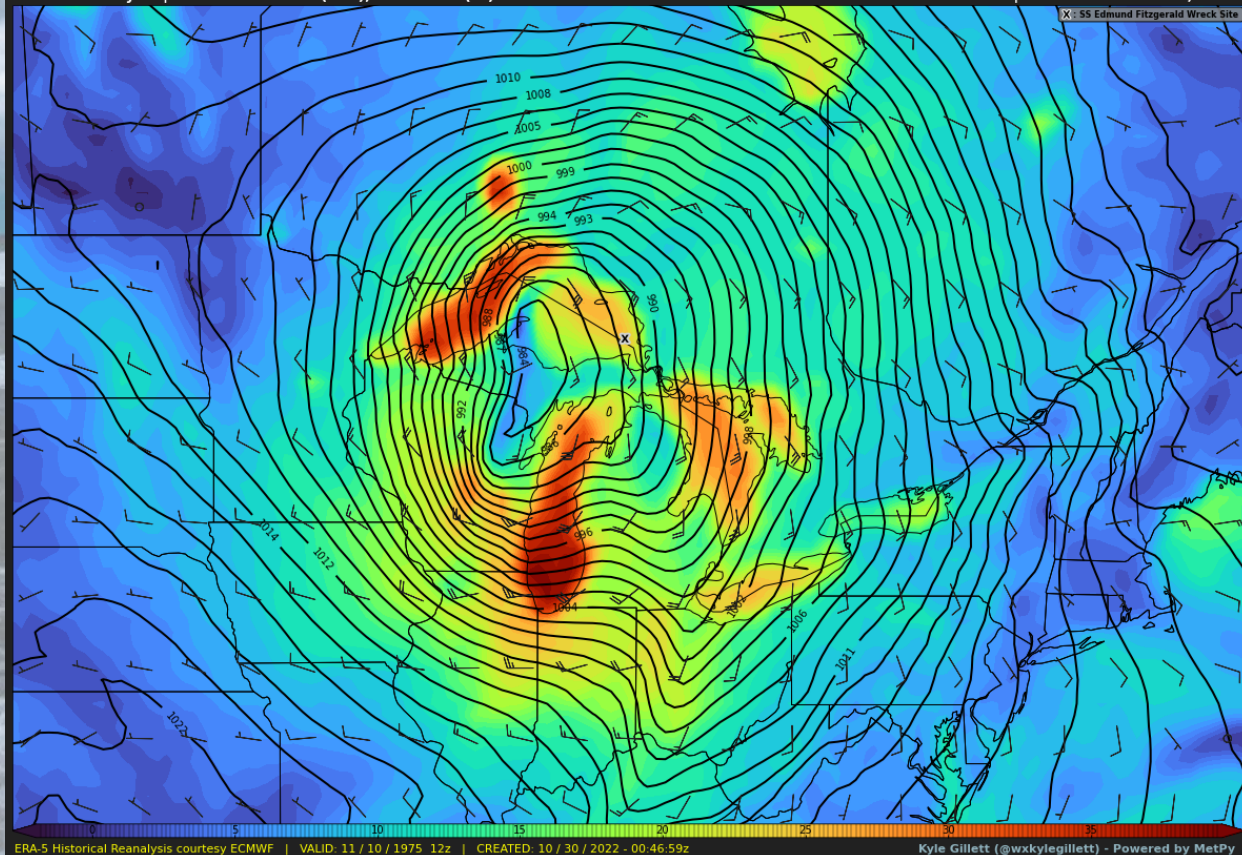
12Z | MON NOVEMBER 10, 1975



500hPa (left), Sfc (right)  
12z 10 Nov 1975 [7am 11/10]

Historical Event Reanalysis: The Wreck of The Edmund Fitzgerald  
ERA-5 Reanalysis | Surface Pressure (hPa), 10m Wind (kt)

12Z | MON NOVEMBER 10, 1975

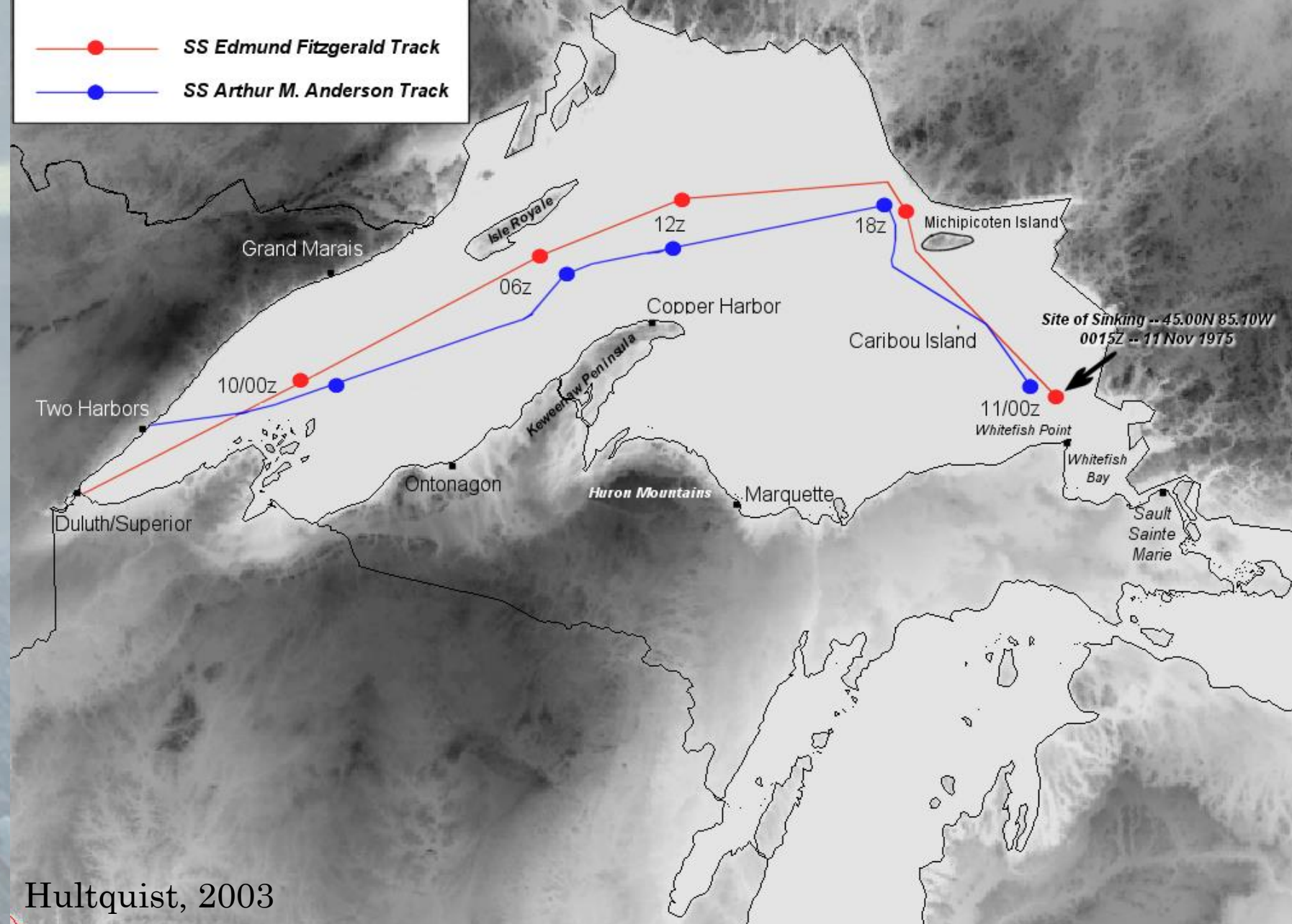




The Final Voyage of the SS Edmund Fitzgerald

09-11 November 1975

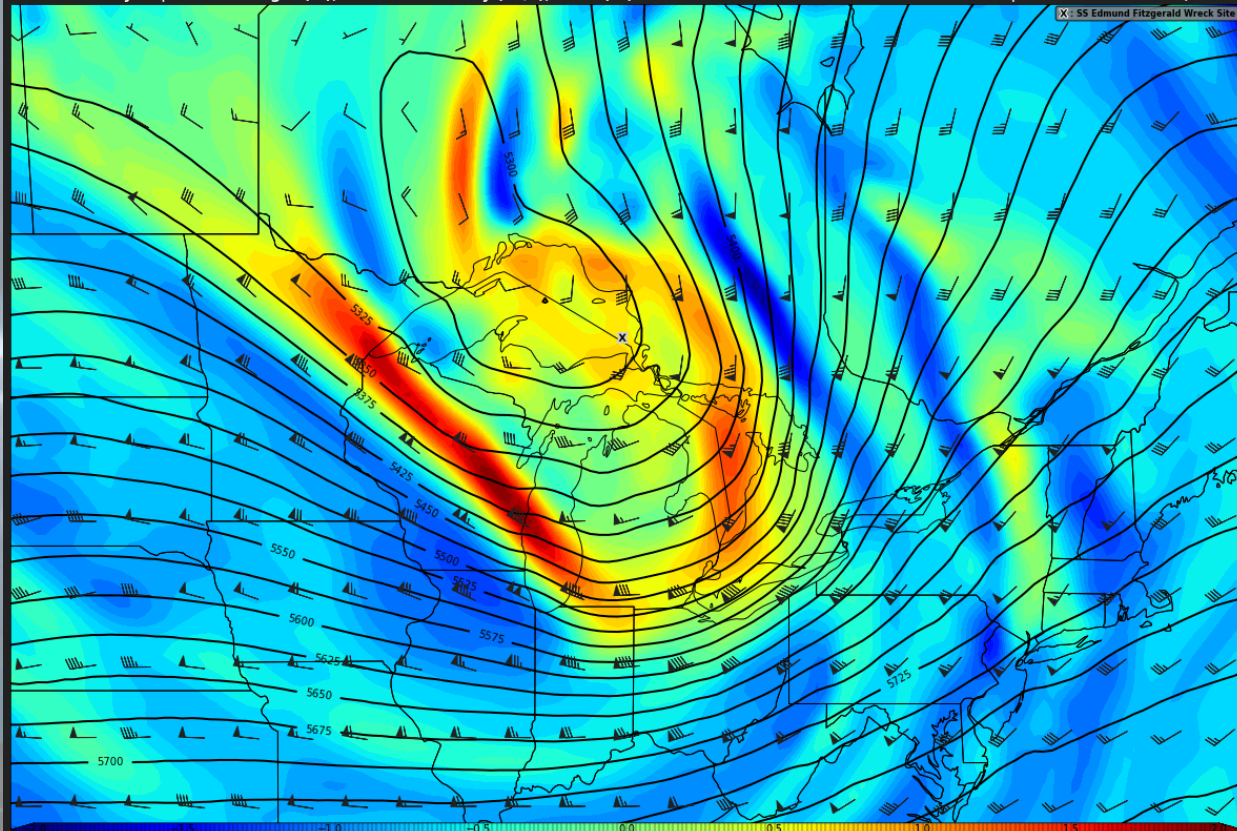
- SS Edmund Fitzgerald Track
- SS Arthur M. Anderson Track





Historical Event Reanalysis: The Wreck of The Edmund Fitzgerald  
ERA-5 Reanalysis | 500 hPa Height (m), Absolute Vorticity (10/s), Wind (kt)

18Z | MON NOVEMBER 10, 1975



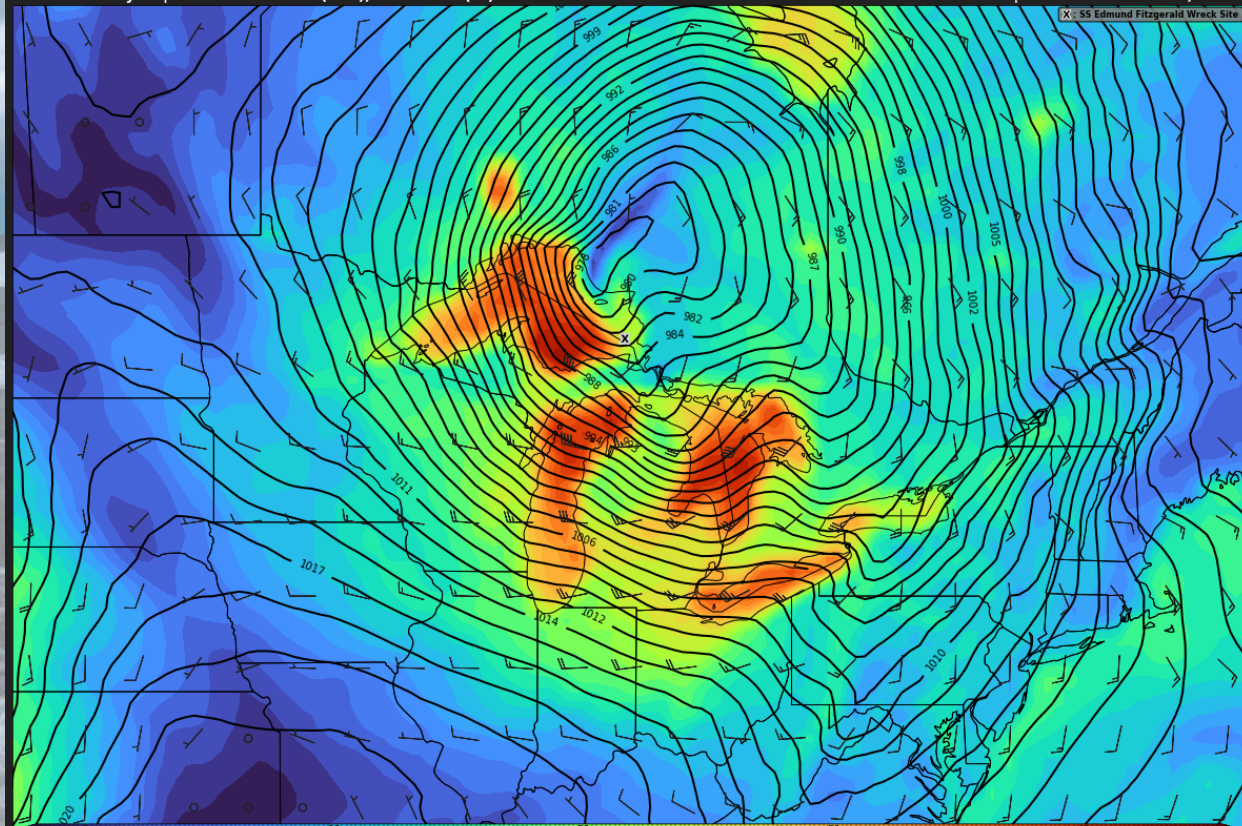
ERA-5 Historical Reanalysis courtesy ECMWF | VALID: 11 / 10 / 1975 18z | CREATED: 10 / 30 / 2022 - 00:27:39z

Kyle Gillett (@wxkylegillett) - Powered by MetPy

500hPa (left), Sfc (right)  
18z 10 Nov 1975 [1pm 11/10]

Historical Event Reanalysis: The Wreck of The Edmund Fitzgerald  
ERA-5 Reanalysis | Surface Pressure (hPa), 10m Wind (kt)

18Z | MON NOVEMBER 10, 1975



ERA-5 Historical Reanalysis courtesy ECMWF | VALID: 11 / 10 / 1975 18z | CREATED: 10 / 30 / 2022 - 00:23:52z

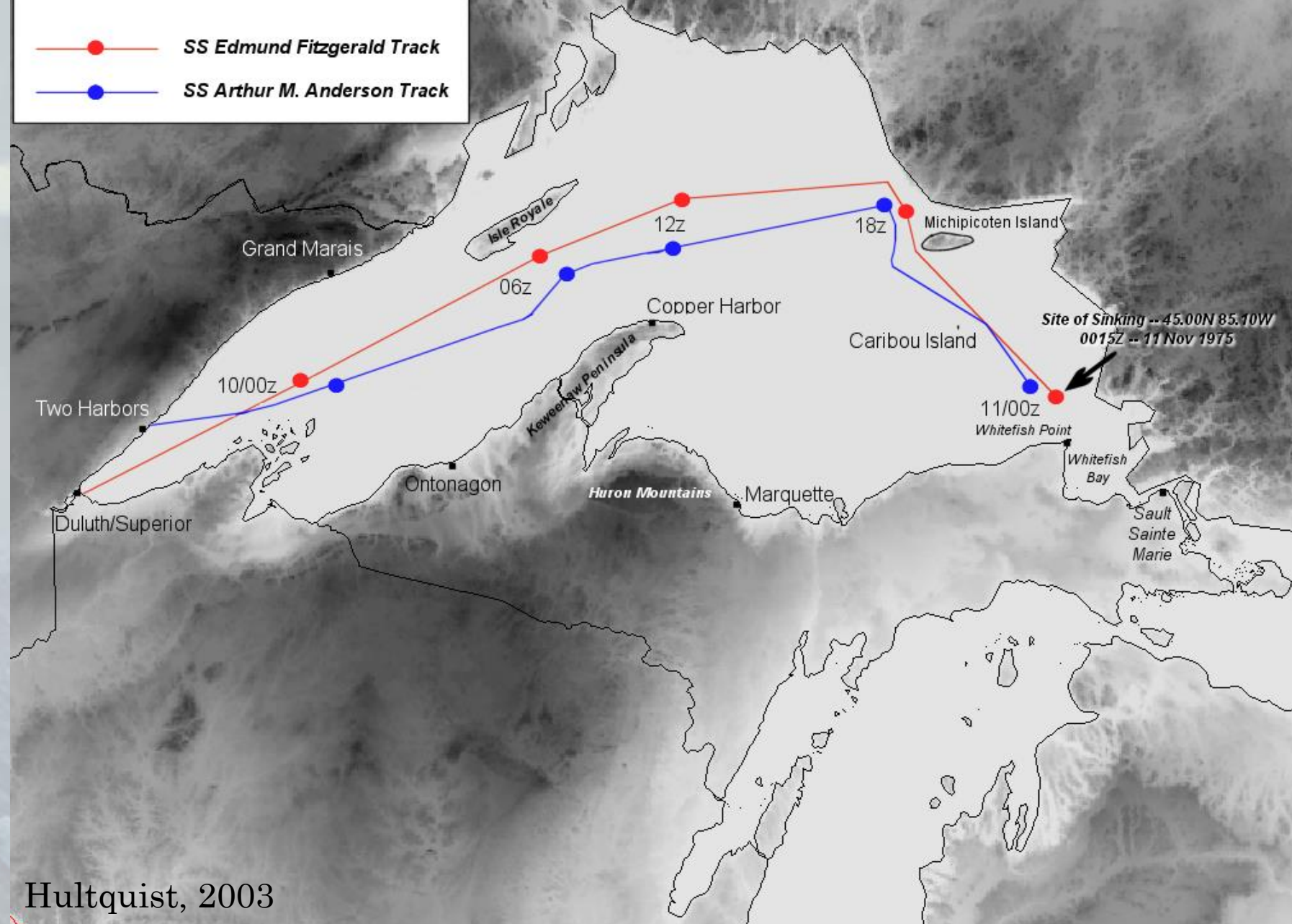
Kyle Gillett (@wxkylegillett) - Powered by MetPy



# The Final Voyage of the SS Edmund Fitzgerald

09-11 November 1975

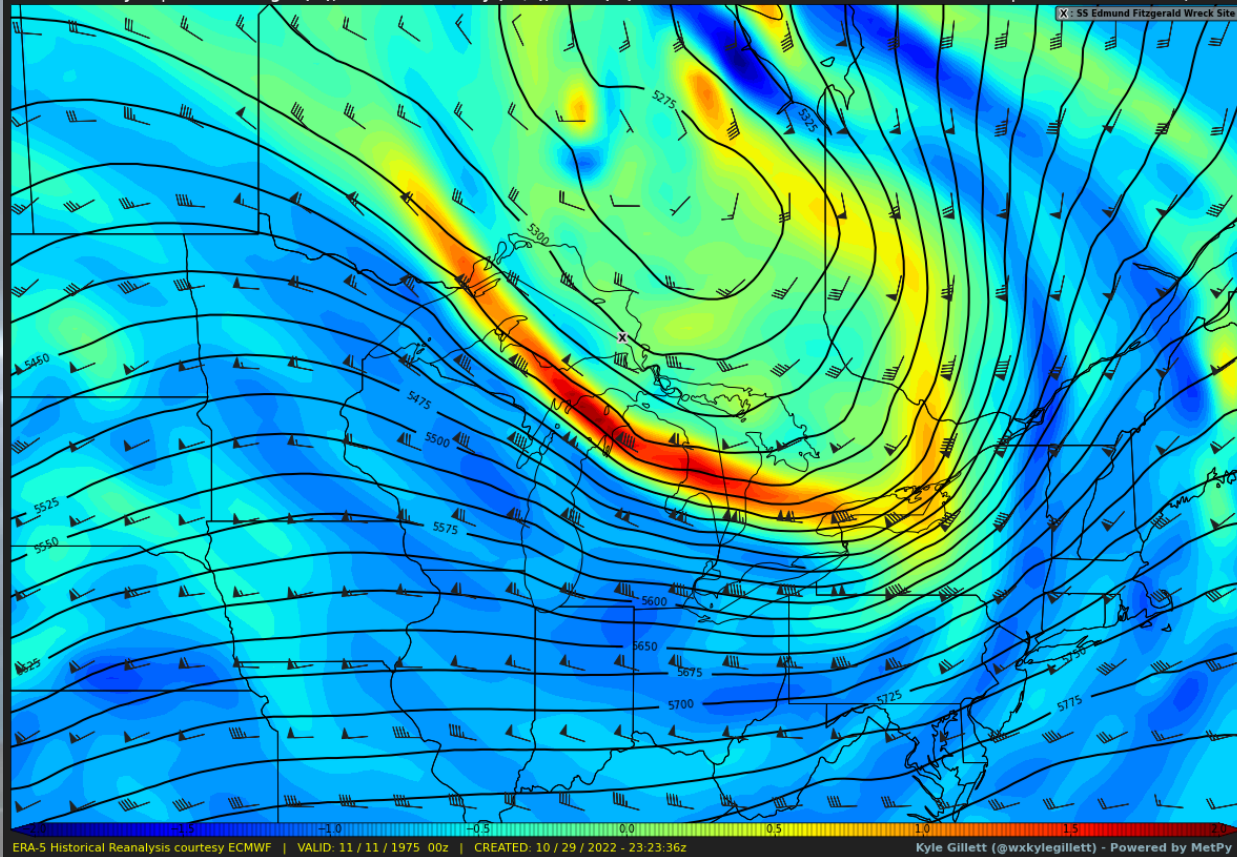
- SS Edmund Fitzgerald Track
- SS Arthur M. Anderson Track





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ERA-5 Reanalysis | 500 hPa Height (m), Absolute Vorticity (10/s), Wind (kt)

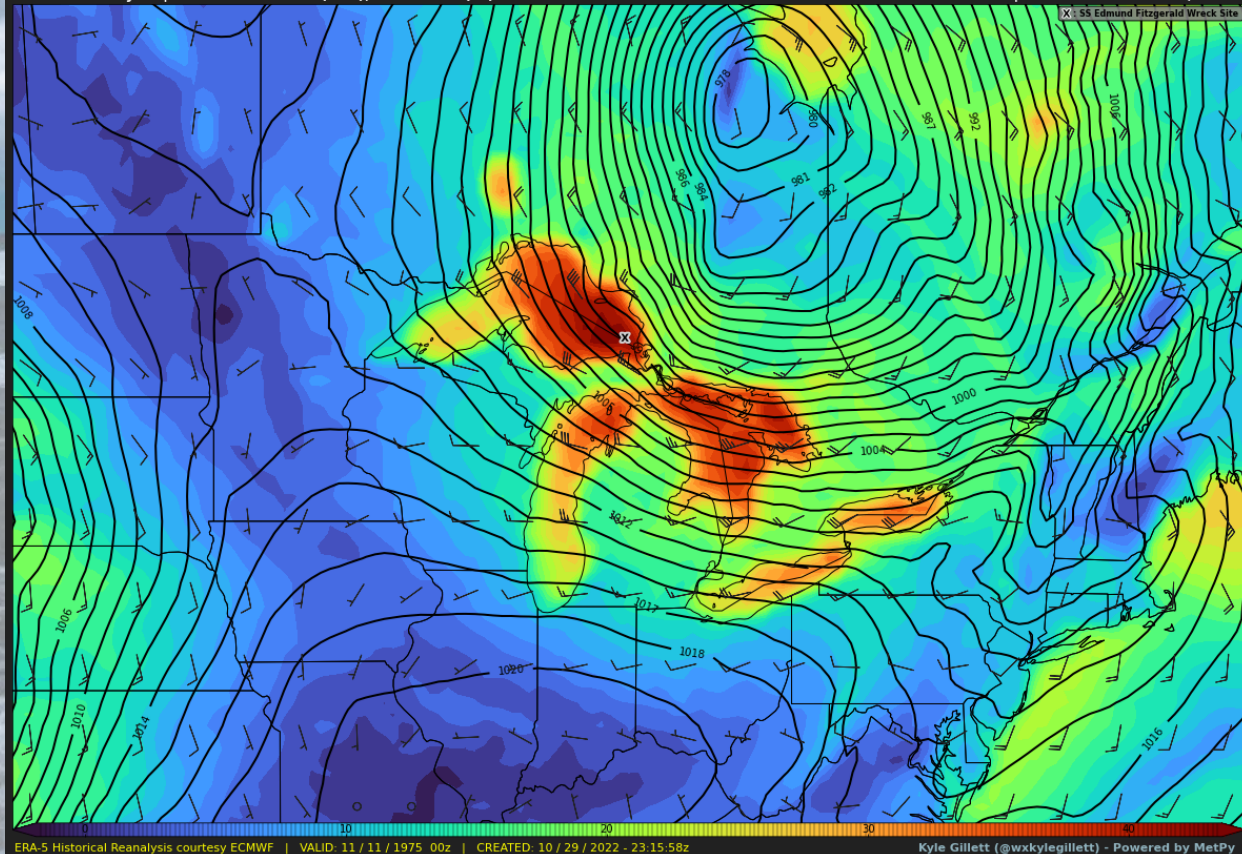
00Z | MON NOVEMBER 11, 1975



500hPa (left), Sfc (right)  
00z 11 Nov 1975 [7pm 11/10]

Historical Event Reanalysis: The Wreck of The Edmund Fitzgerald  
ERA-5 Reanalysis | Surface Pressure (hPa), 10m Wind (kt)

00Z | MON NOVEMBER 11, 1975

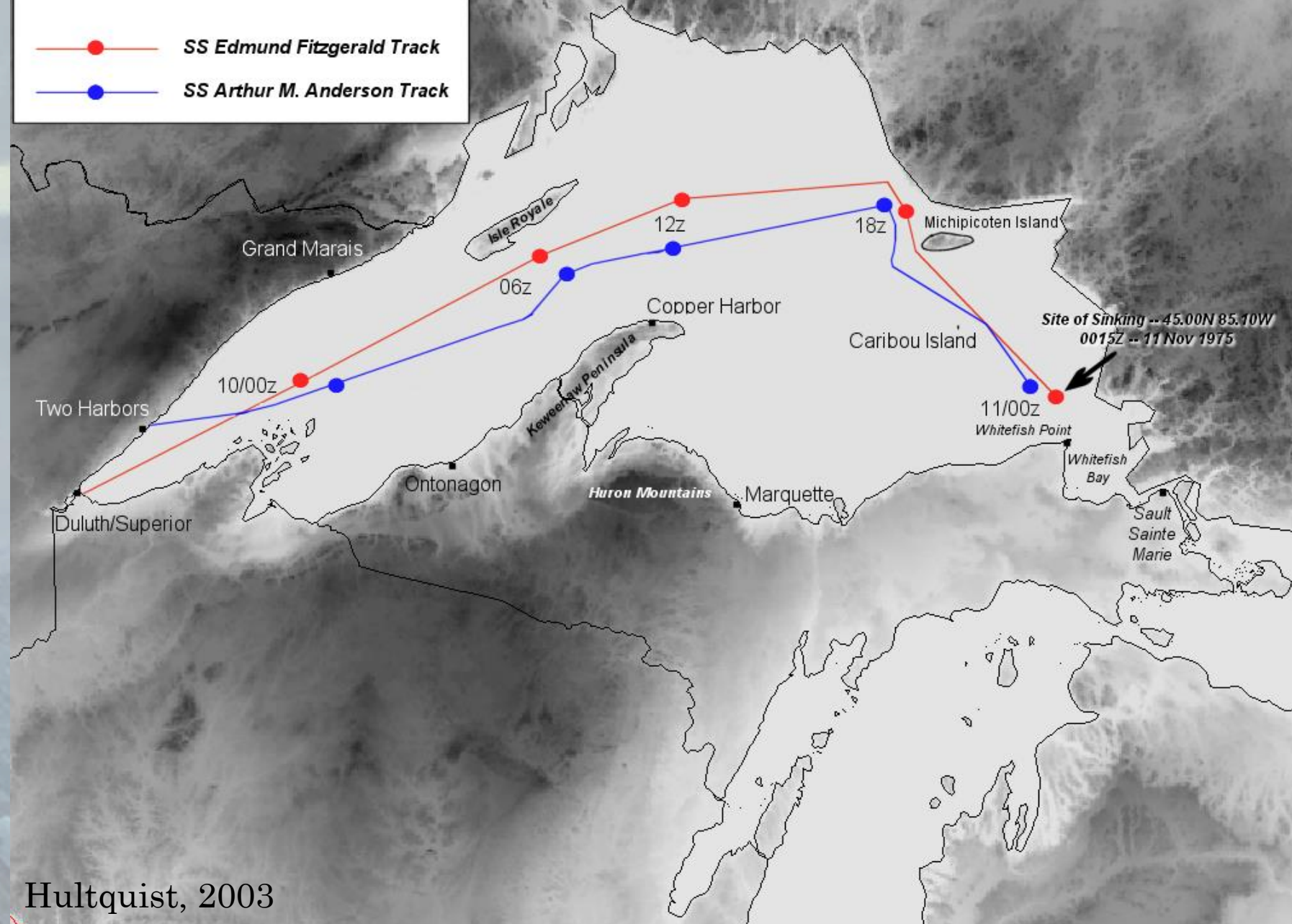




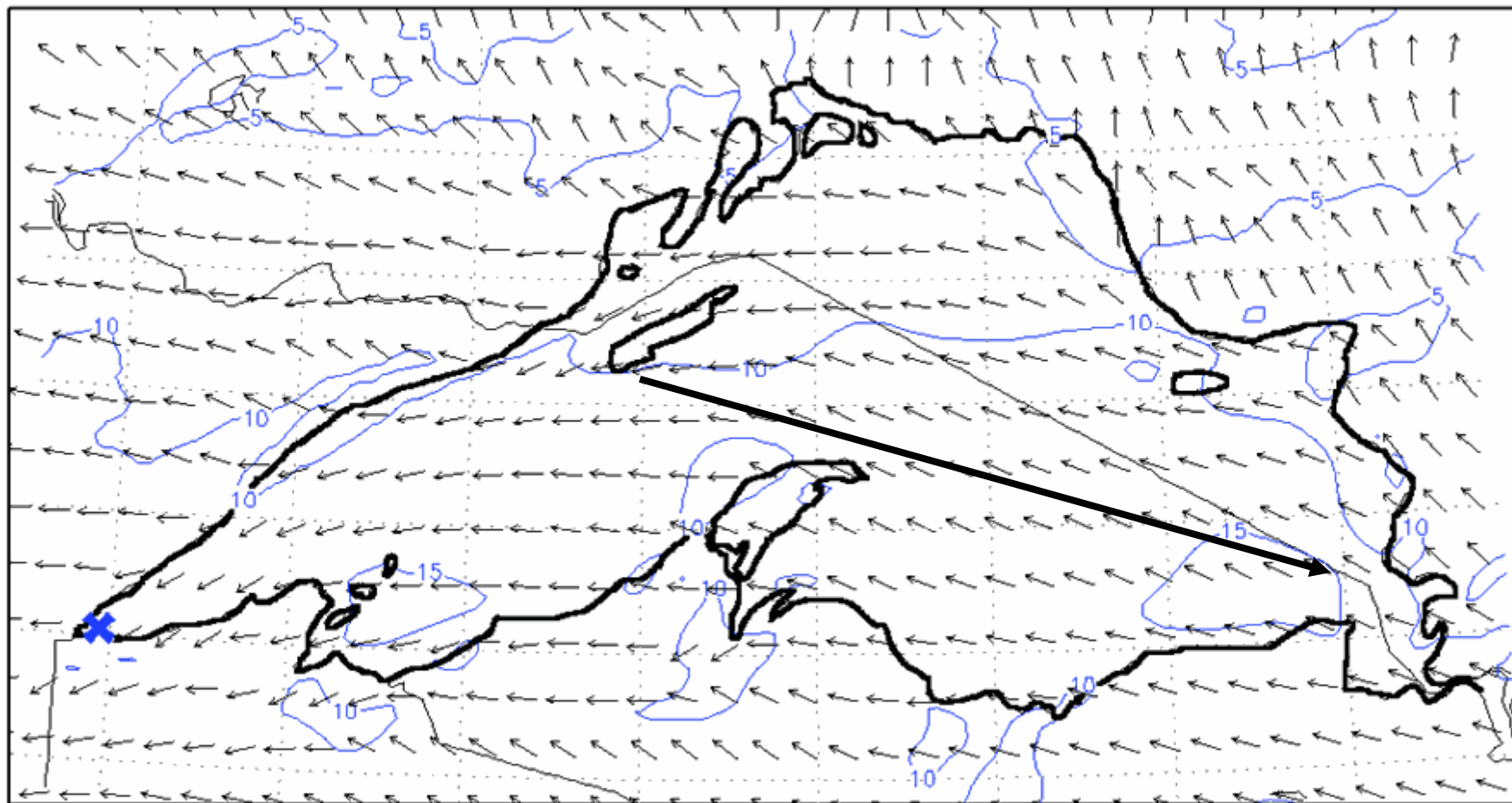
The Final Voyage of the SS Edmund Fitzgerald

09-11 November 1975

- SS Edmund Fitzgerald Track
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# 1 PM EST, November 9, 1975

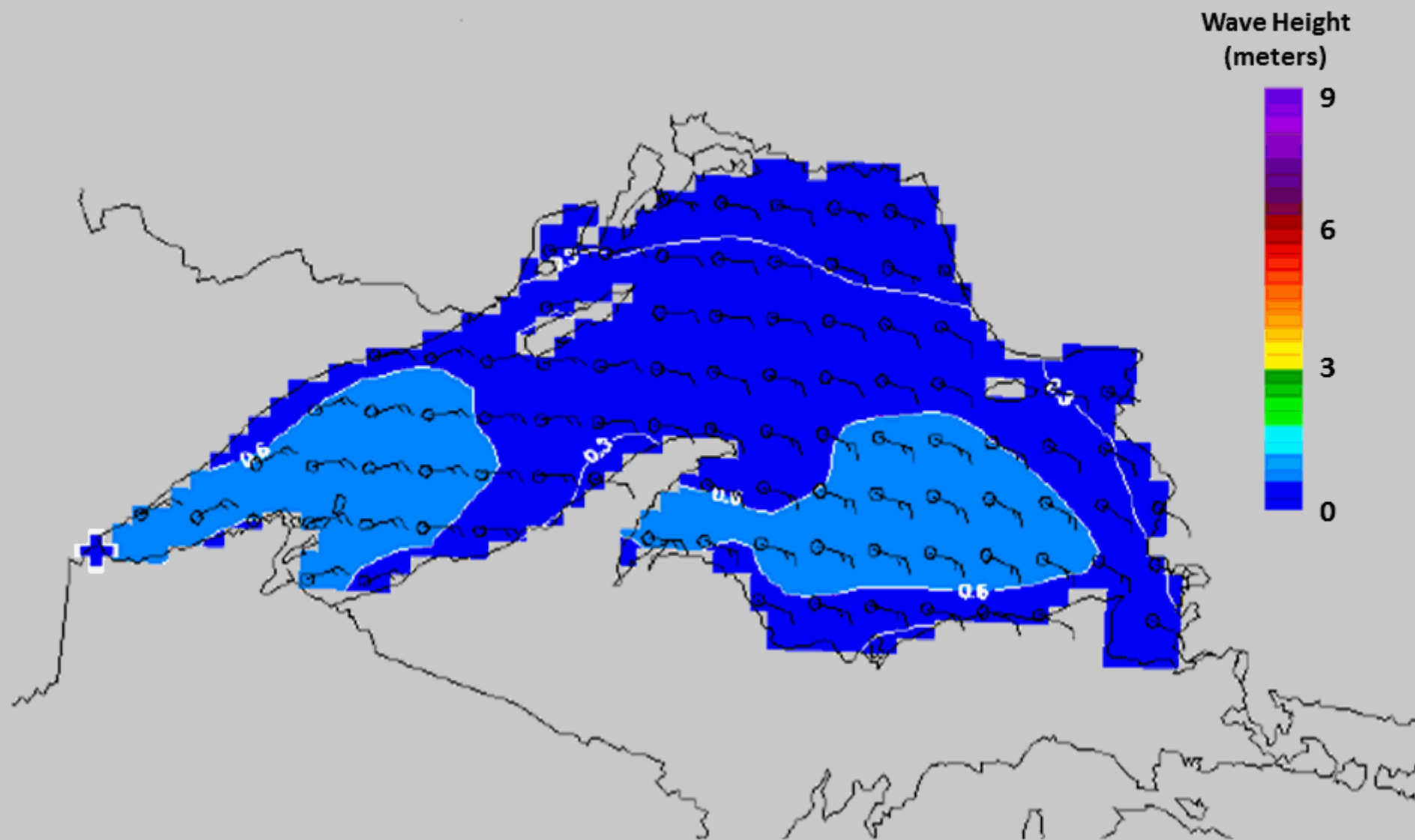


50 Meter Wind Speed (Knots) & Wind Direction





# 1 PM EST, November 9, 1975



(Hultquist, 2003)

Wave height in color (meters) and wind field

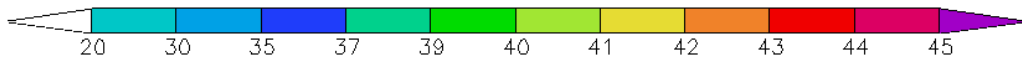
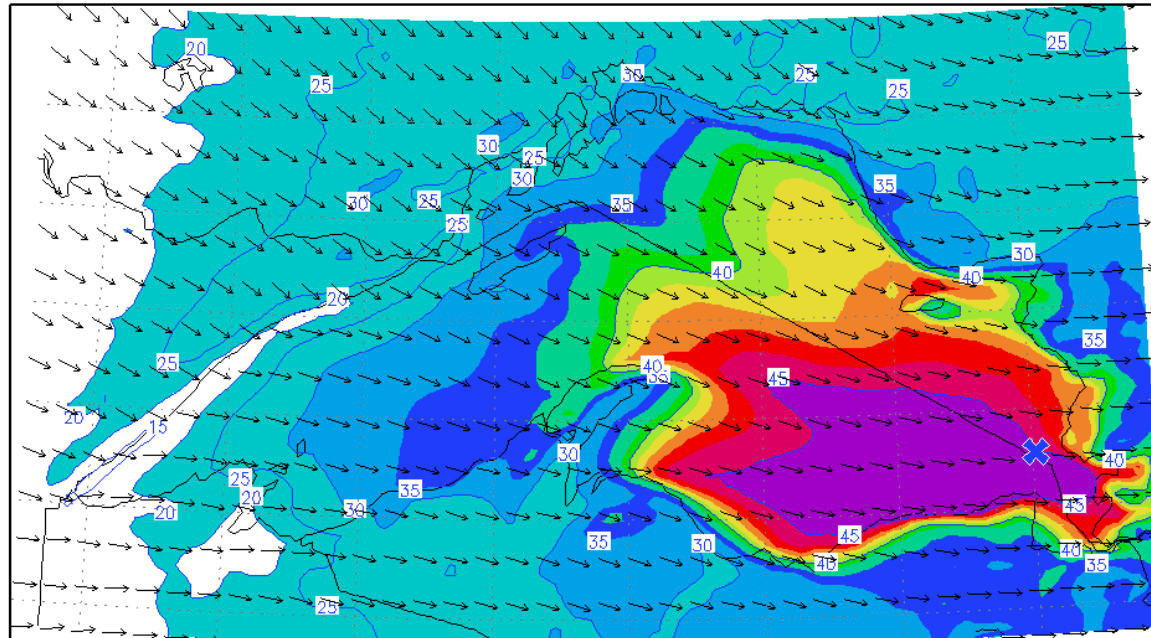


# 45-55kt (51-63mph)

[many reports suggested 60-80 mph winds]

## Final Voyage of the Edmund Fitzgerald November 9–11 1975

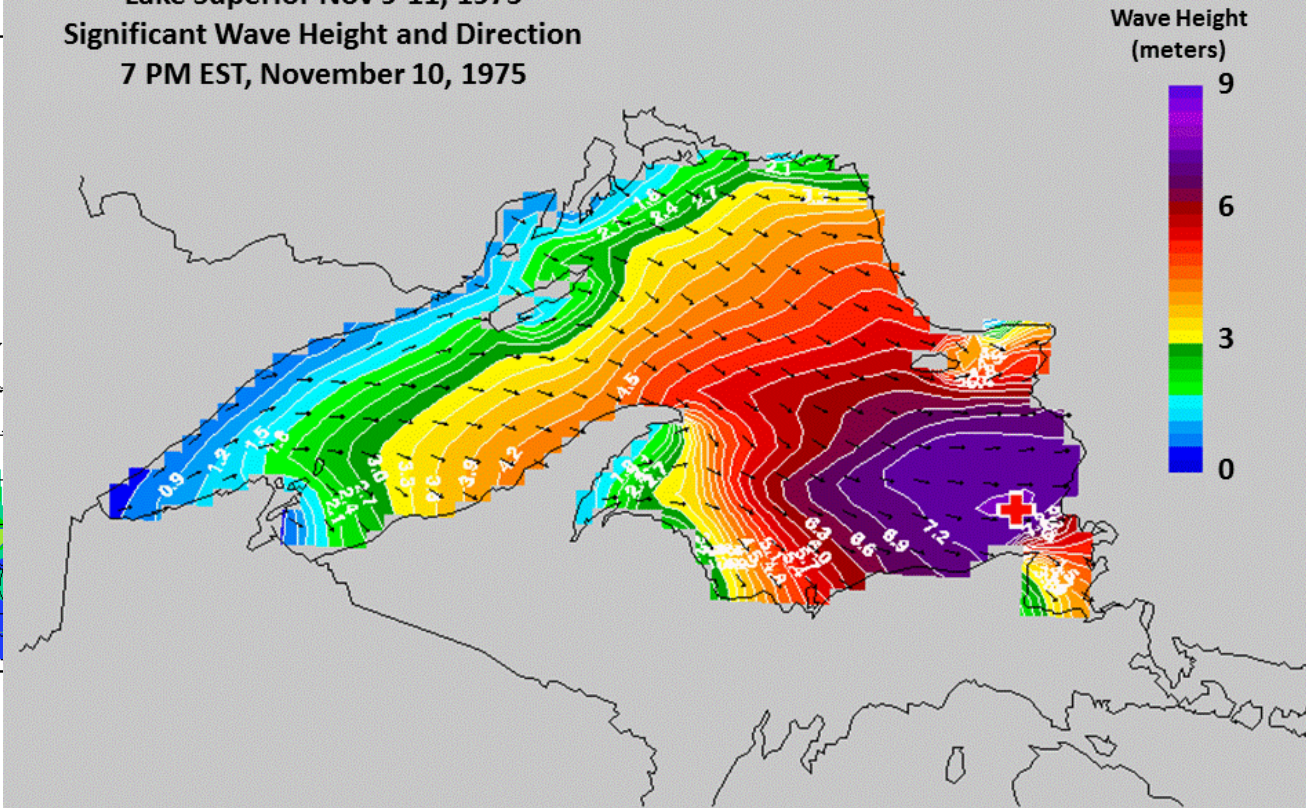
50m Wind Speed (kt) & Wind Direction -- 00Z11NOV1975



# 7-10m (22-32ft)

[reports from the Anderson suggest 30-35ft waves]

## Last Voyage of the Edmund Fitzgerald Lake Superior Nov 9-11, 1975 Significant Wave Height and Direction 7 PM EST, November 10, 1975



Wave Height  
(meters)





1km grid spacing nest 50m  
wind speed

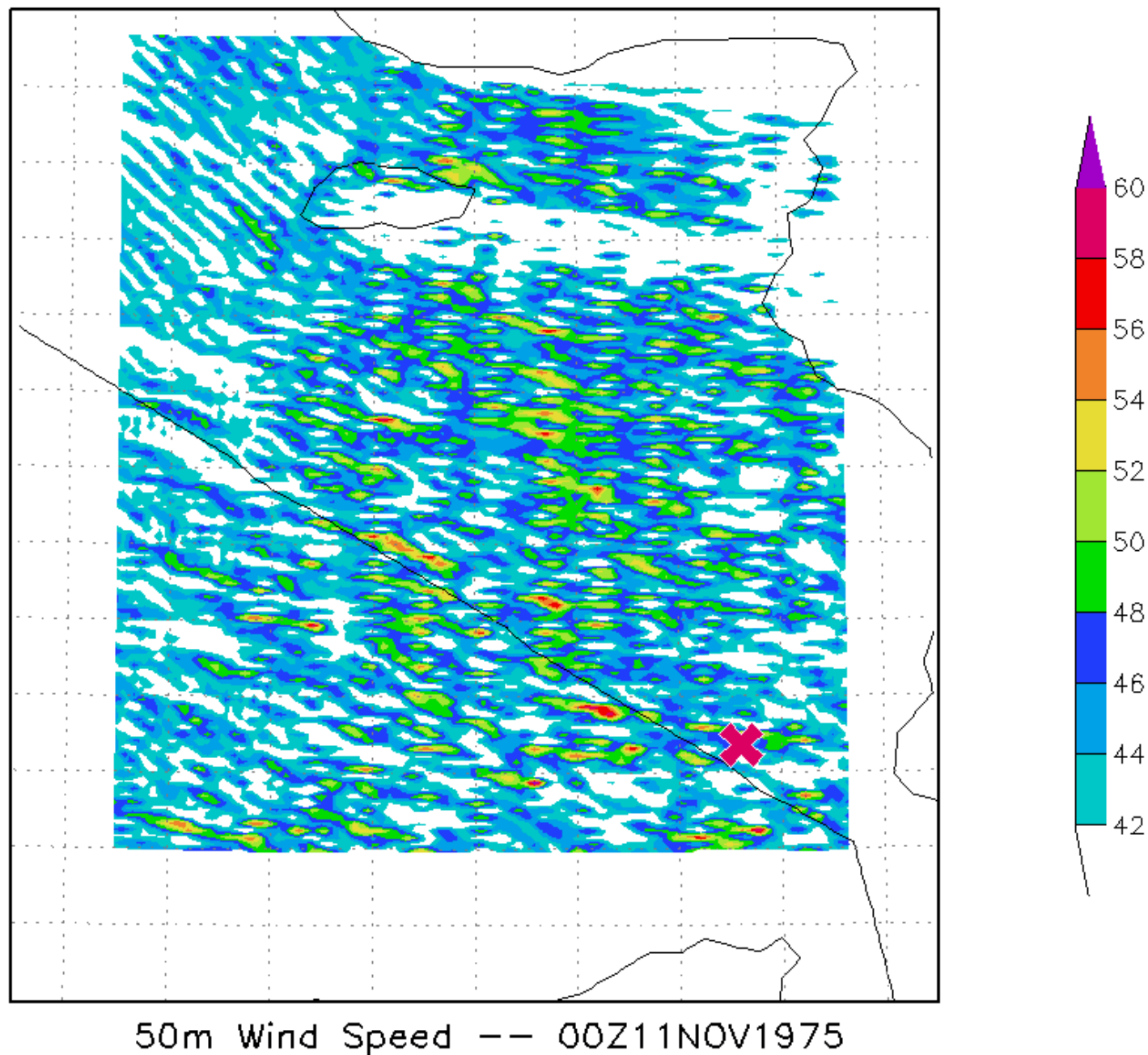
Model indicates localized  
55-65kt pockets

(Up to 75mph!)

Likely associated with  
horizontal roll convection  
cells and snow squalls.

(Hultquist, 2003)

Final Voyage of the Edmund Fitzgerald  
November 9-11 1975





*I' was the witch of November come stealin'*

The Fitzgerald rounded Caribou Island shortly after 3pm

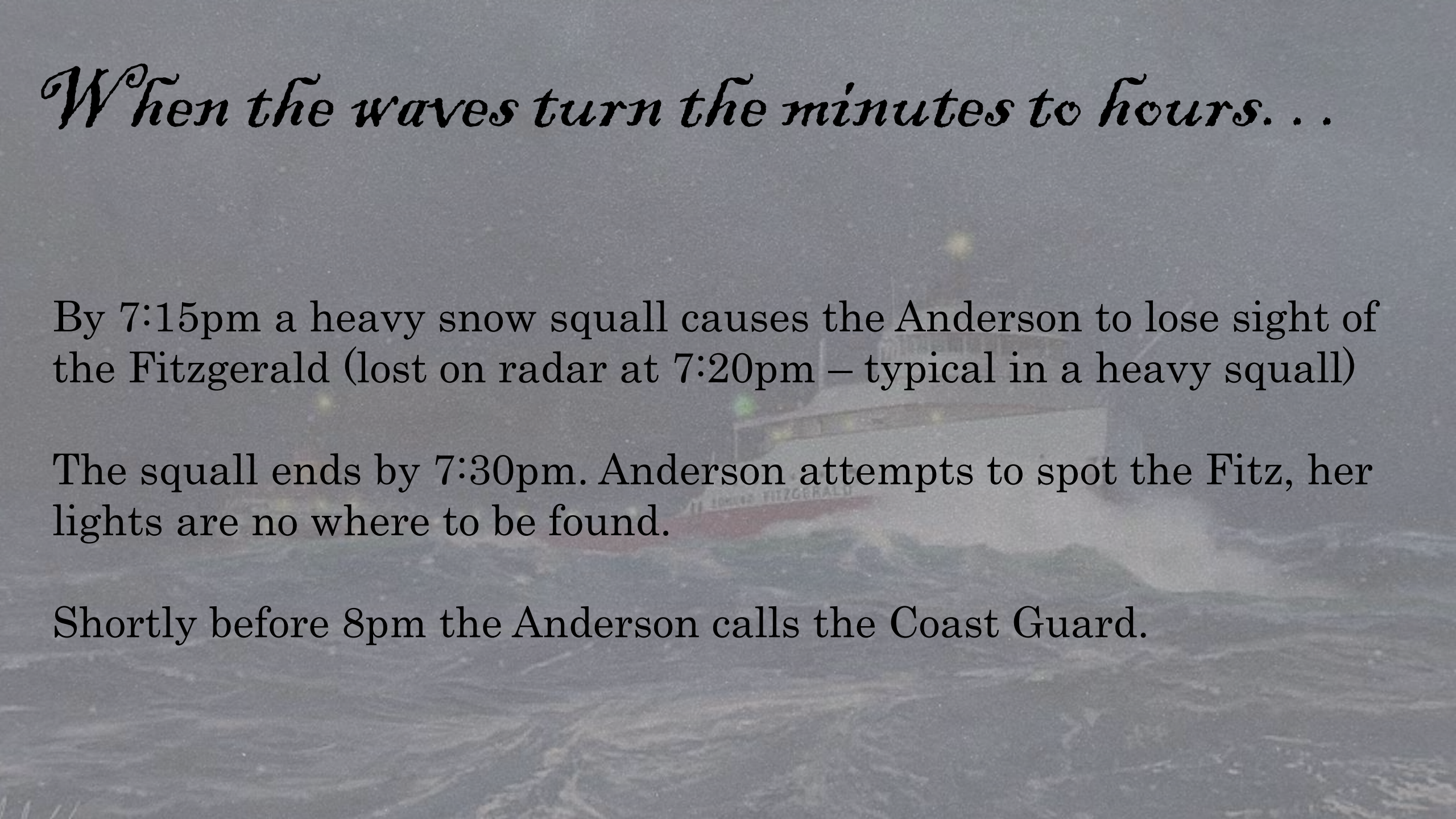
Captain Cooper of the SS Arthur M. Anderson reports the Fitzgerald is too close to 'Six Fathom Shoals' near the island

At 3:30pm Cpt. McSorley radios Cpt. Cooper "water coming in"

At 4:10pm the Fitz loses both radars

At 7:10pm "we are holding our own"





*When the waves turn the minutes to hours. . .*

By 7:15pm a heavy snow squall causes the Anderson to lose sight of the Fitzgerald (lost on radar at 7:20pm – typical in a heavy squall)

The squall ends by 7:30pm. Anderson attempts to spot the Fitz, her lights are no where to be found.

Shortly before 8pm the Anderson calls the Coast Guard.





*And all that remains is the faces and the names  
and the wives and the sons and the daughters*