Meteorology – Lecture 1

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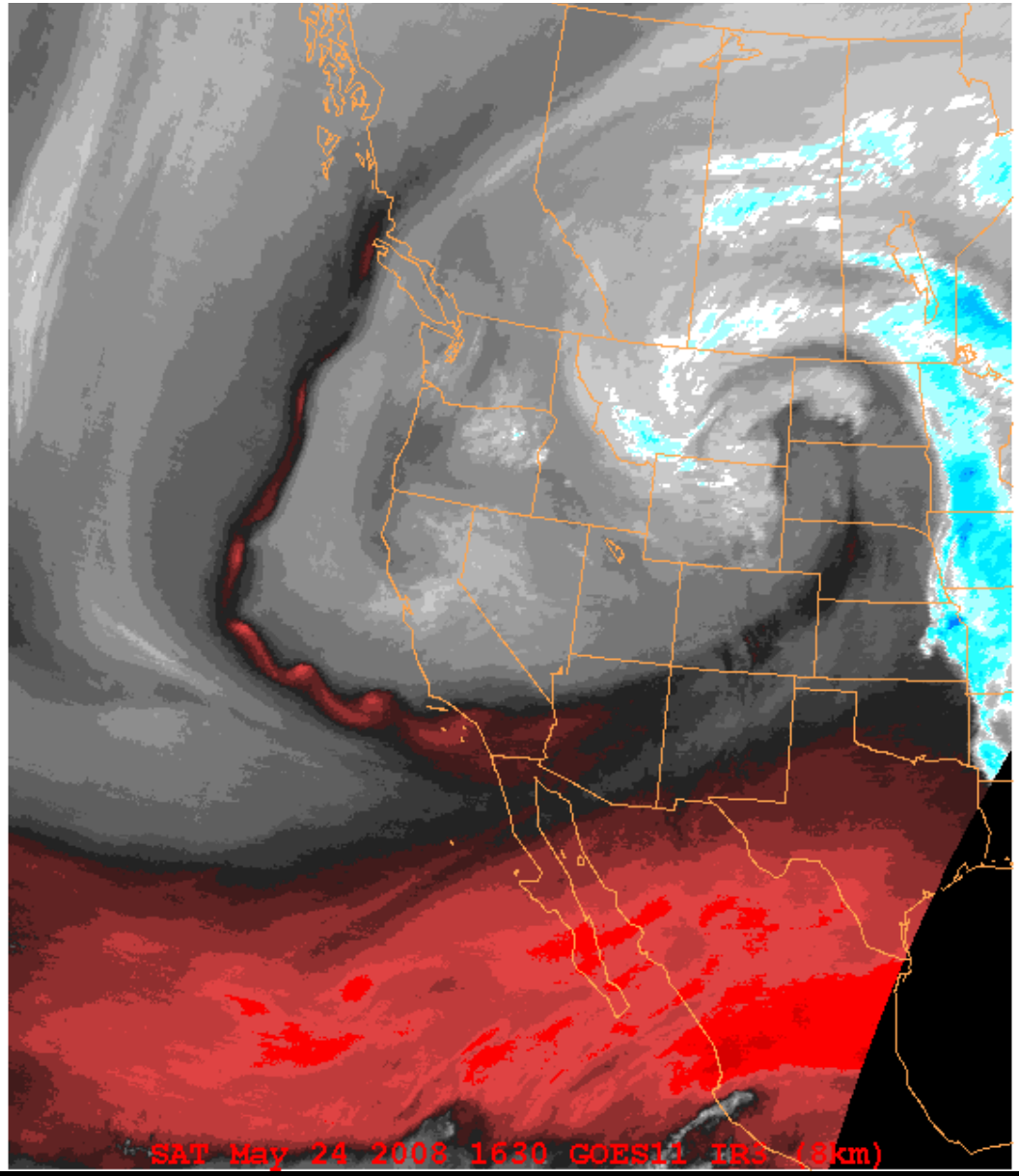
Important notes

- These slides show some figures and videos prepared by Robert G. Fovell (RGF) for his “Meteorology” course, published by The Great Courses (TGC). Unless otherwise identified, they were created by RGF.
- In some cases, the figures employed in the course video are different from what I present here, but these were the figures I provided to TGC at the time the course was taped.
- These figures are intended to supplement the videos, in order to facilitate understanding of the concepts discussed in the course. *These slide shows cannot, and are not intended to, replace the course itself and are not expected to be understandable in isolation.*
- Accordingly, these presentations do not represent a summary of each lecture, and neither do they contain each lecture’s full content.

Animations linked in the PowerPoint version of these slides may also be found here:

http://people.atmos.ucla.edu/fovell/meteo/

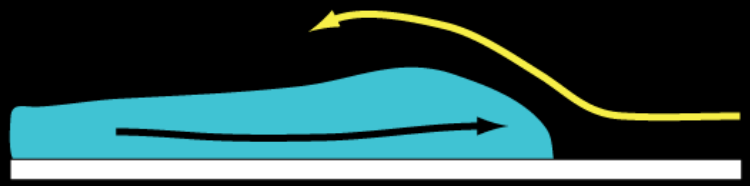
Water vapor satellite imagery loop



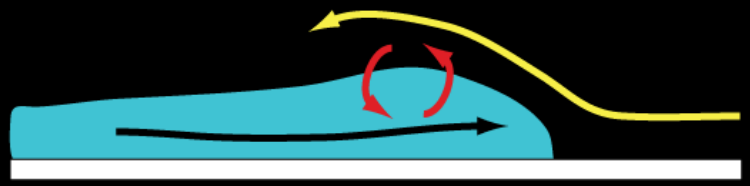
Animation

Kelvin-Helmholtz wave example

A pool of cold, dense air spreading along the surface…

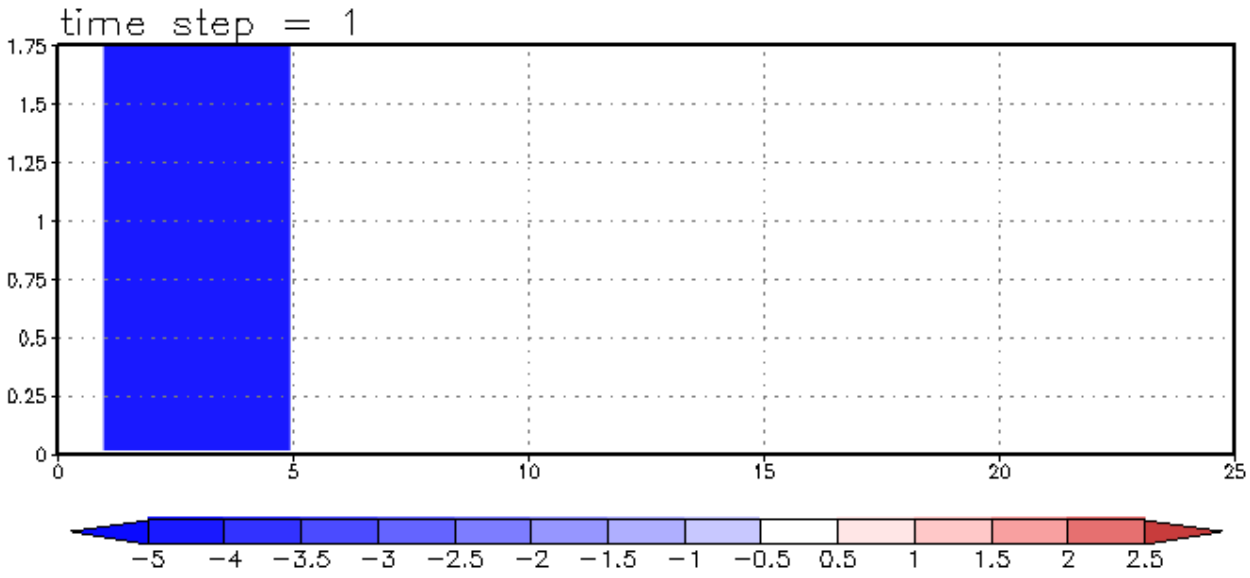


Less dense air is forced to rise over the cold pool…



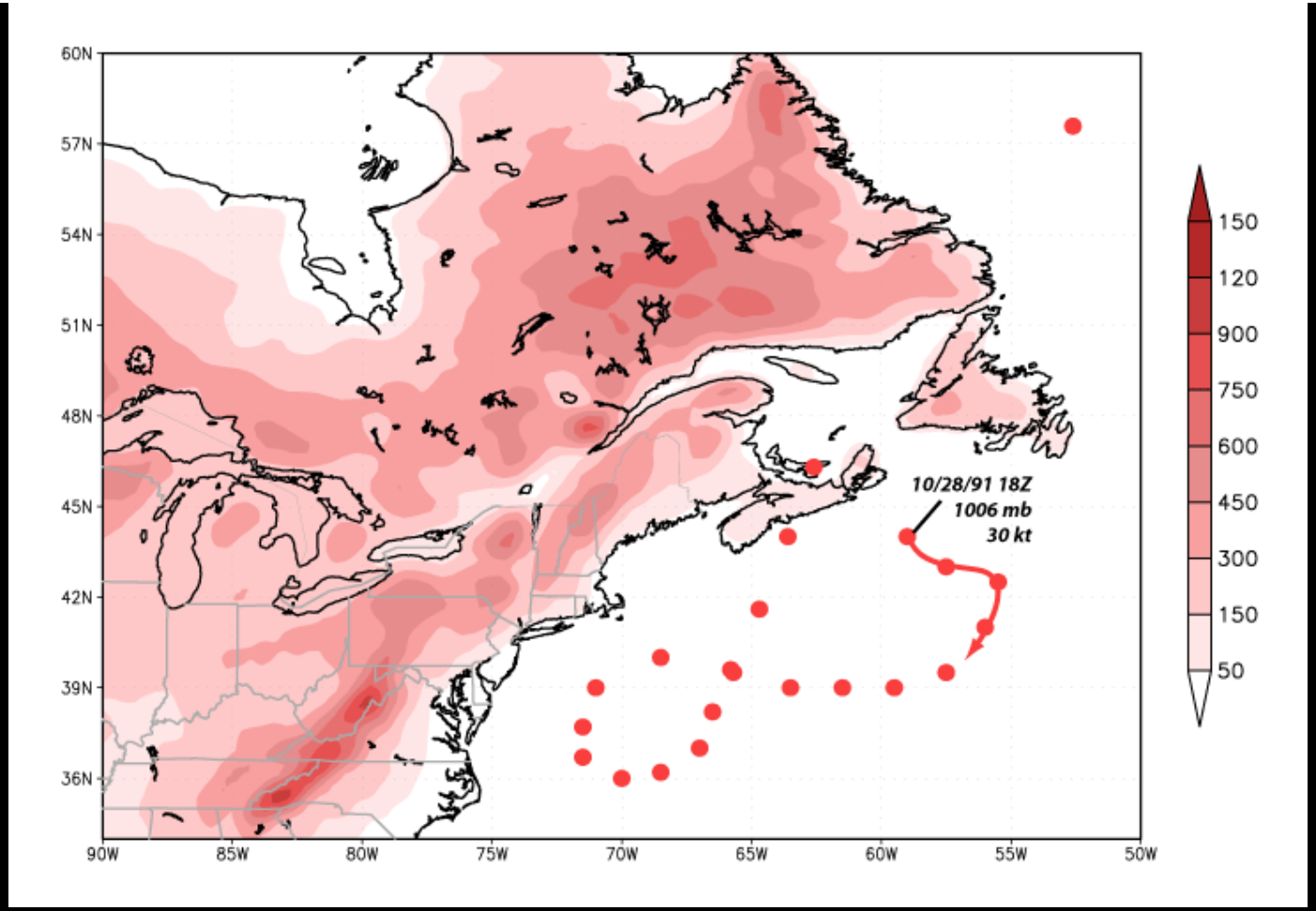
The vertical shear, or change of wind speed and/or direction with height, induces **rotation**.

Animation

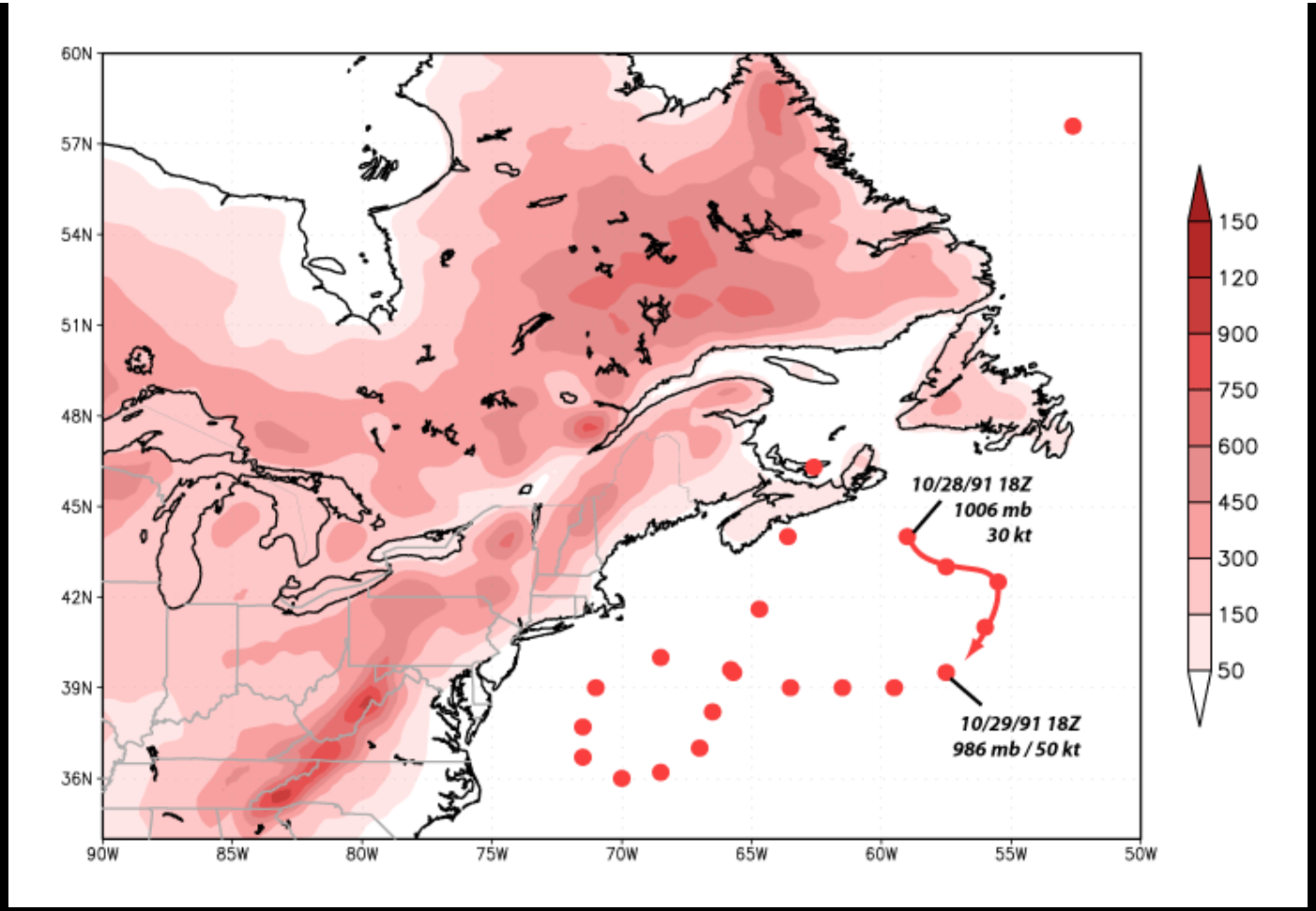


Kelvin-Helmholtz billow animation

“The Perfect Storm”



Map showing topography (shaded), positions of the “Perfect Storm”, along with central pressures and winds, at various times.



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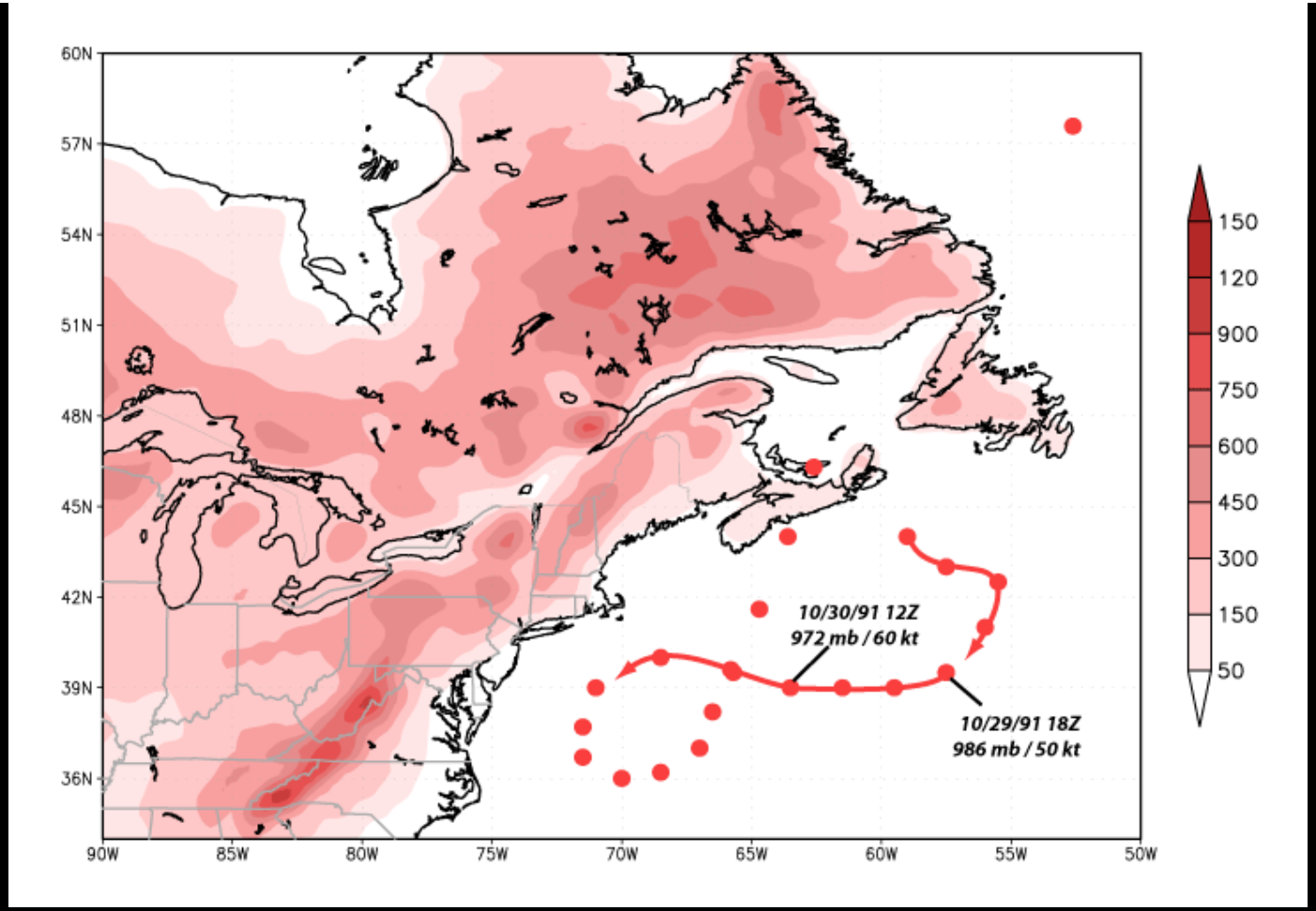

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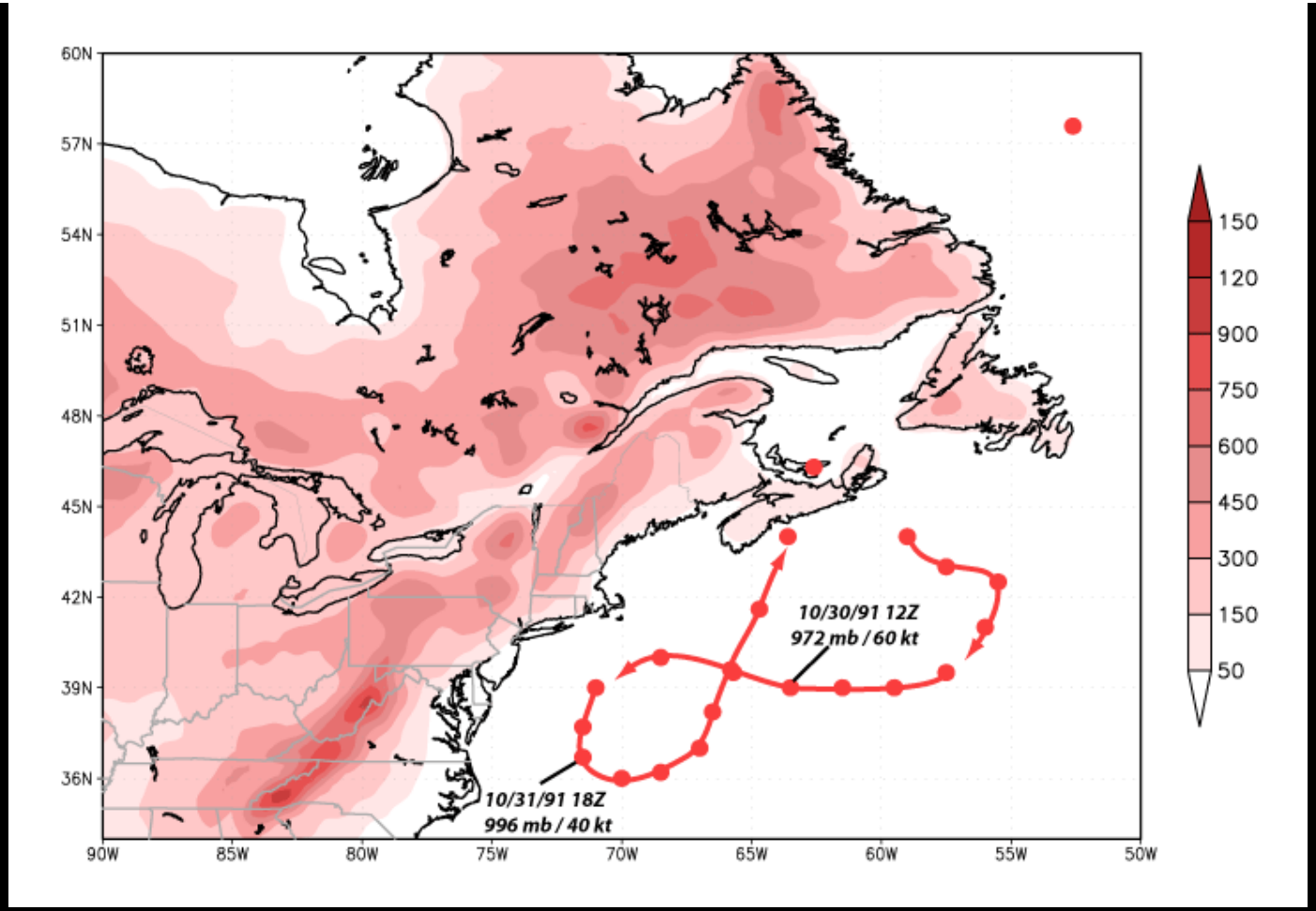

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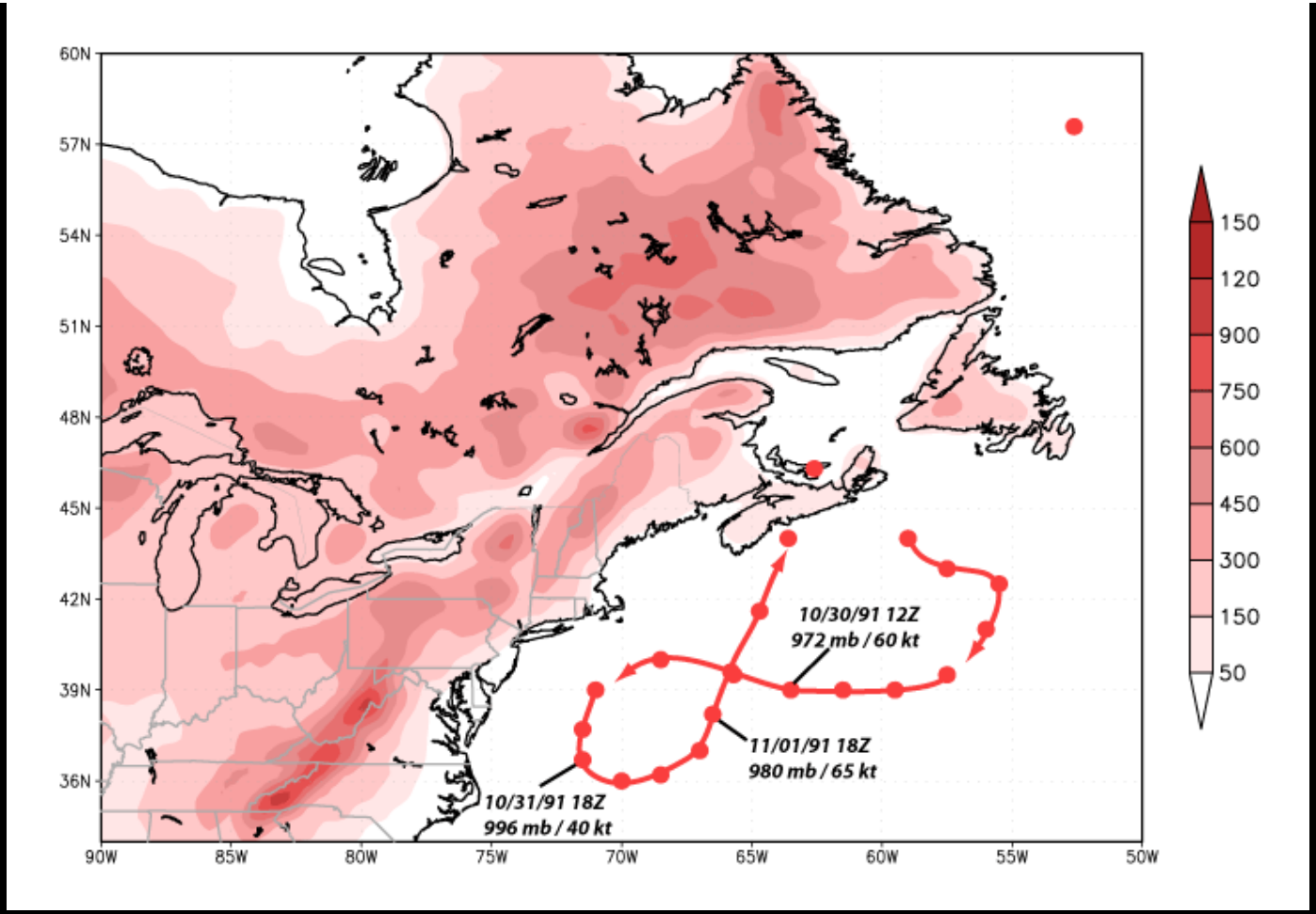

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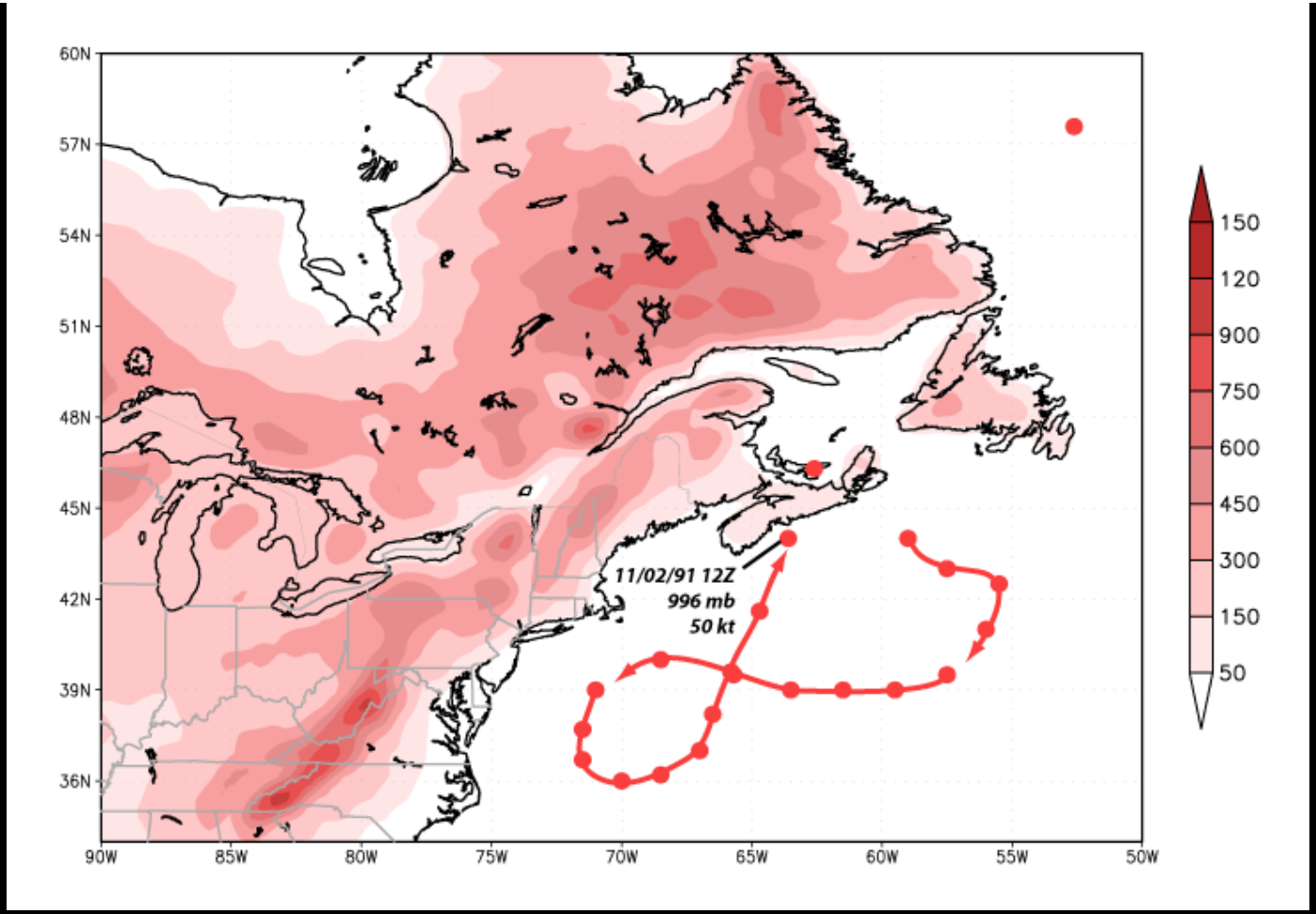

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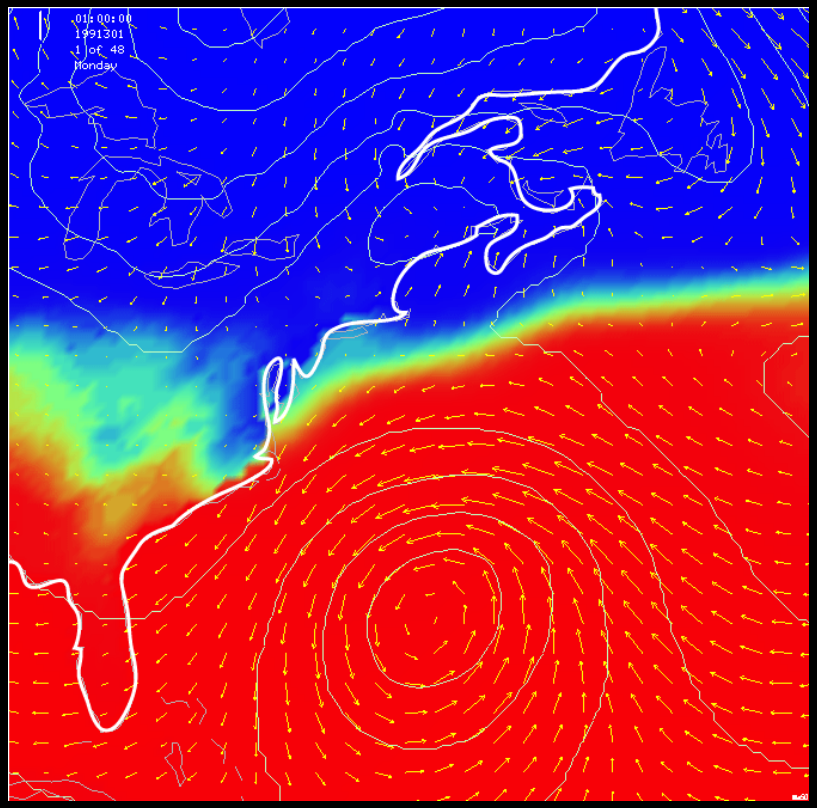
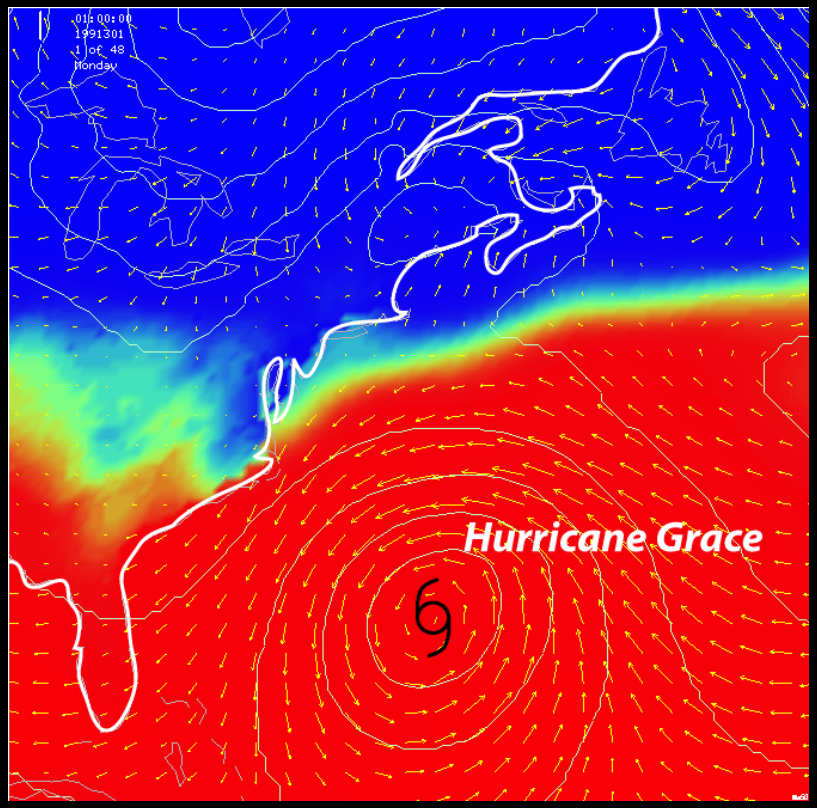
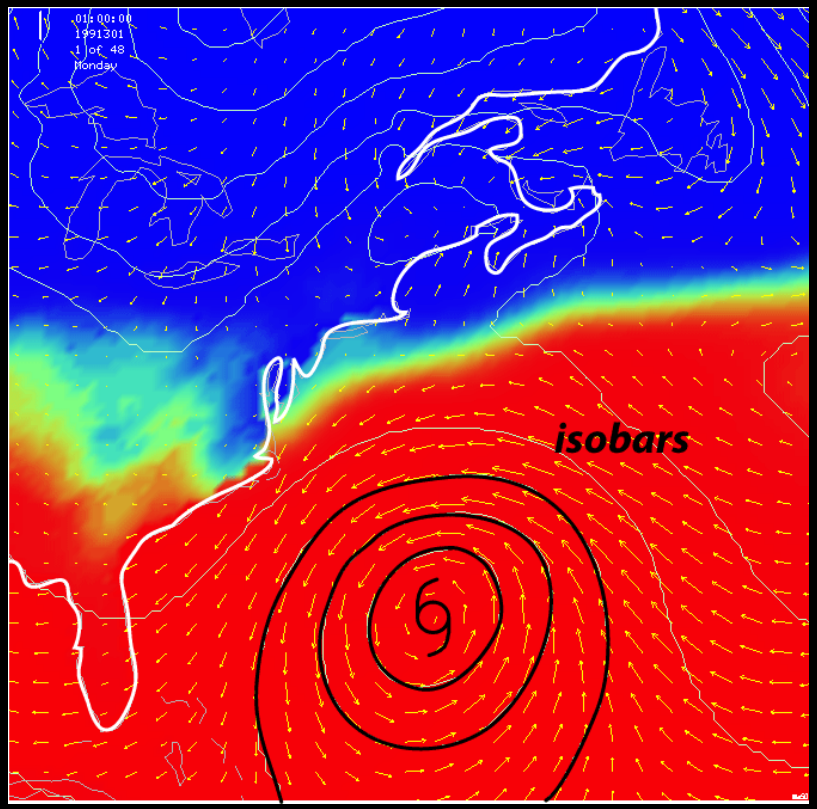


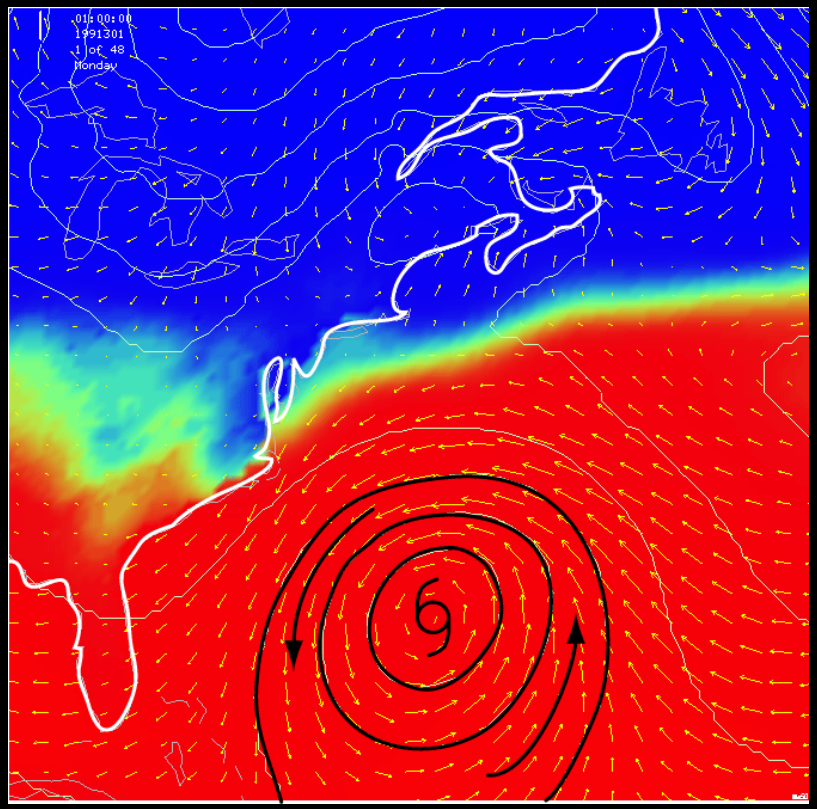
Still from animation depicting surface temperature (colored) and winds (vectors)



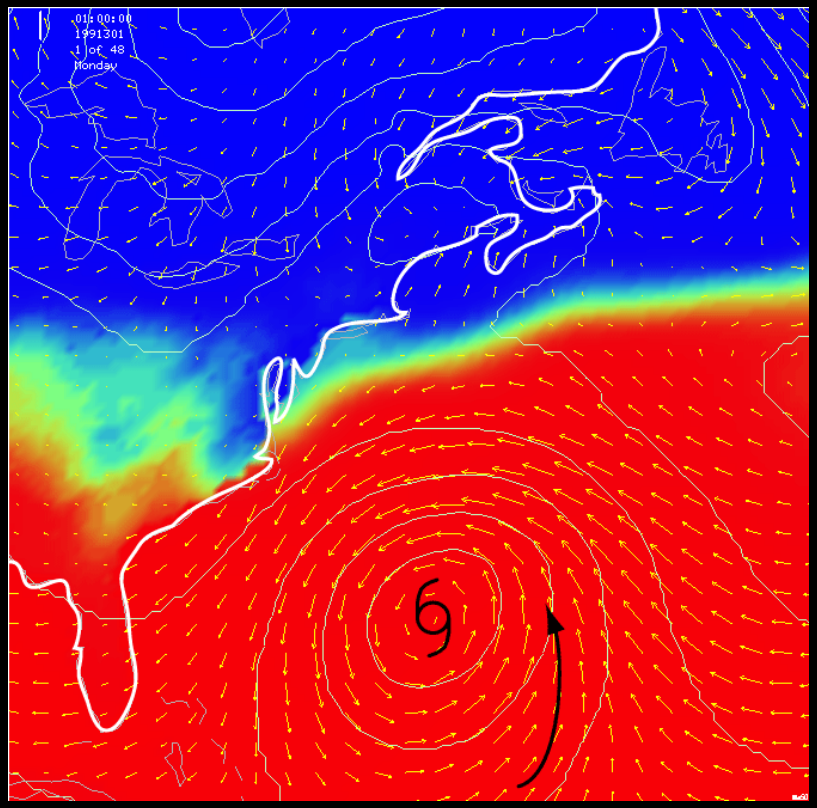
Hurricane Grace's position is identified



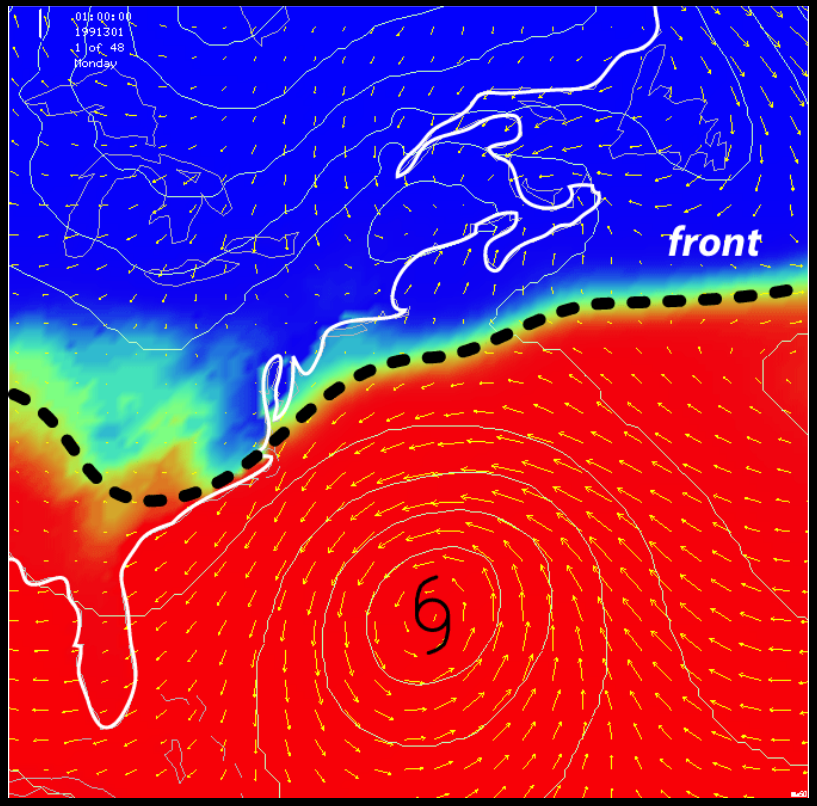
Isobars associated with Hurricane Grace are drawn



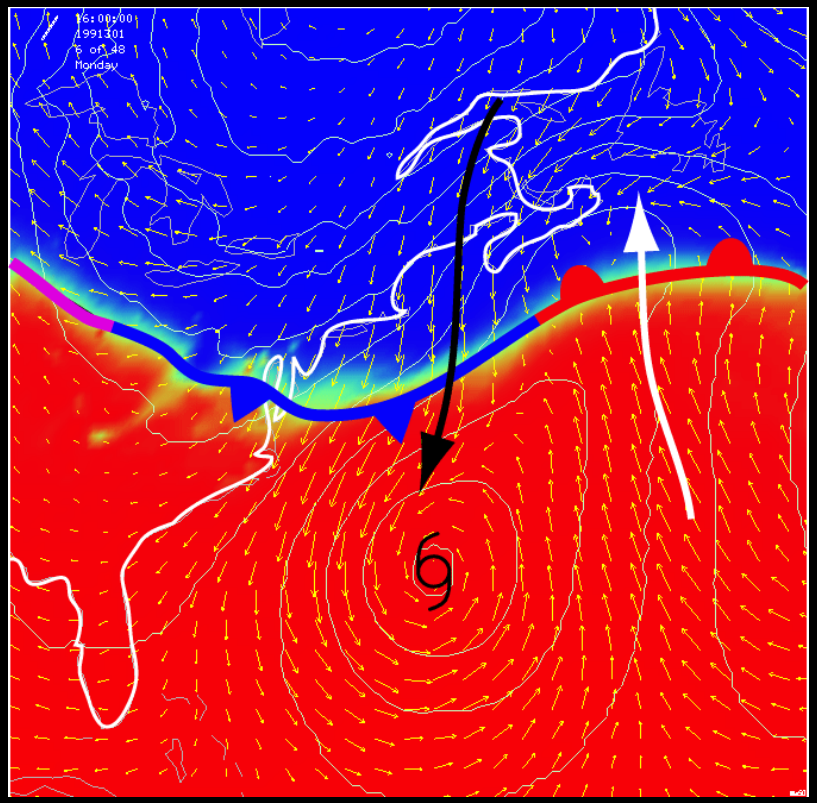
Surface geostrophic wind associated with Hurricane Grace is identified



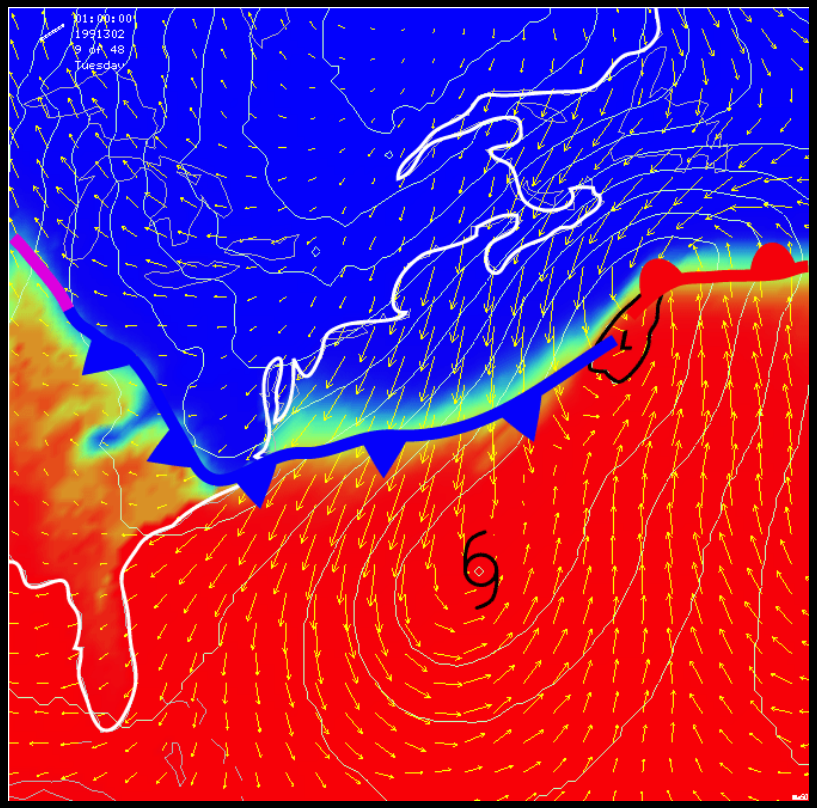
Near the surface, friction helps the wind blow across isobars, towards lower pressure



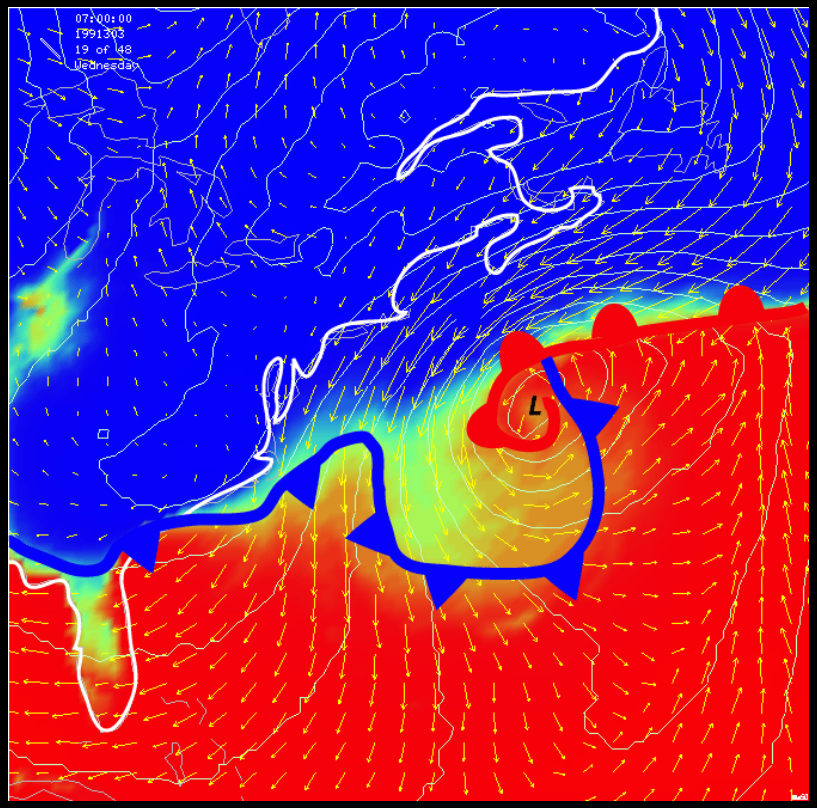
The surface front located to the north of Grace is identified



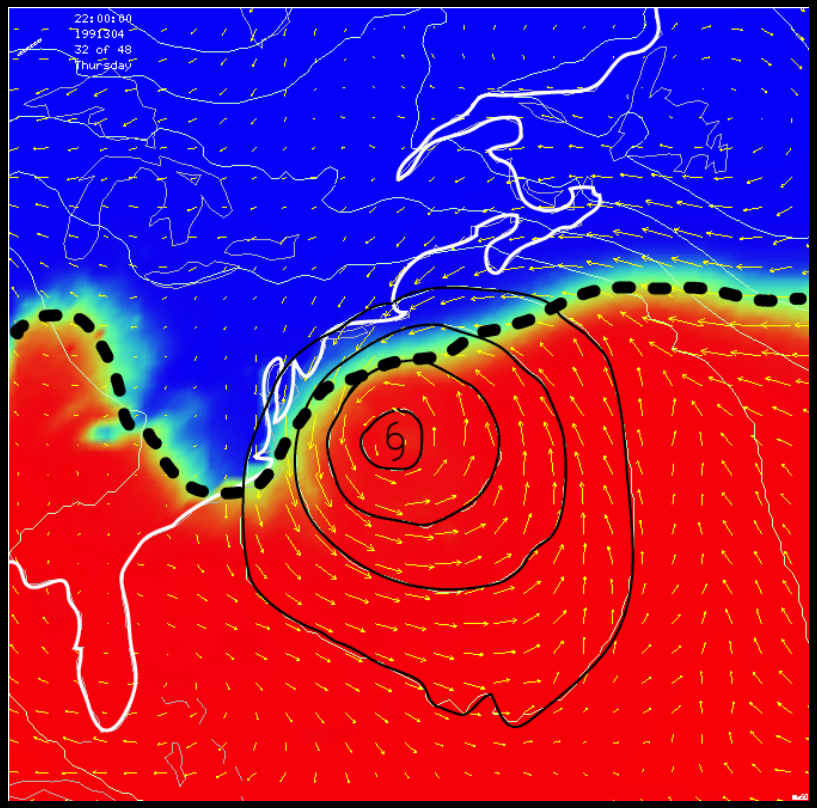
Surface winds on either side of the front help indicate how the frontal boundary will shift with time



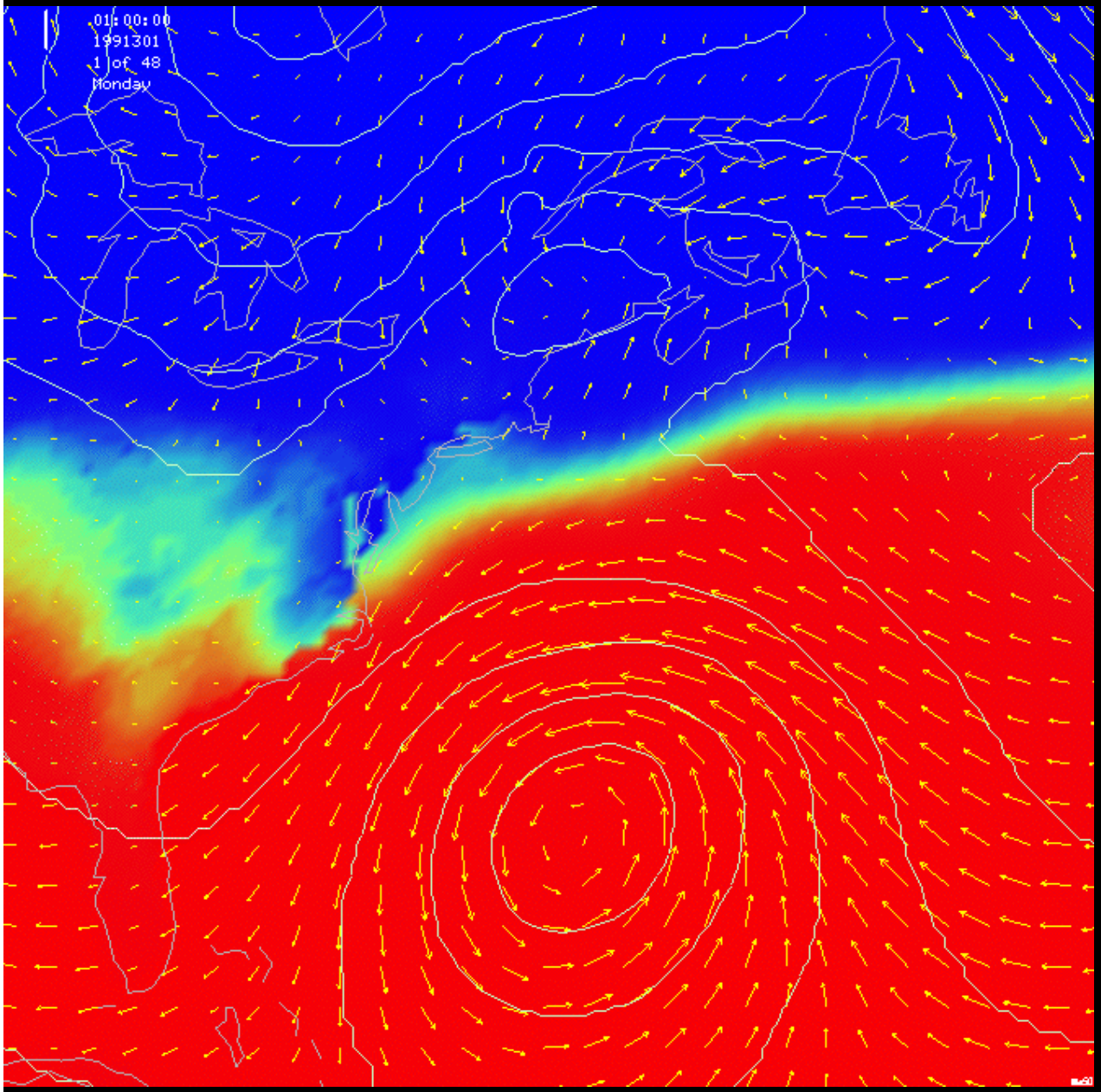
Cold and warm frontal segments appear. The cold front moves towards Hurricane Grace. A new low develops along the front.



Grace is absorbed into the advancing front. The new low develops further.



The end result is a new cyclonic storm that develops hurricane characteristics over the warm sea surface: the “unnamed hurricane”.



Animation

[end]