Plumes Over the Pacific: Will Japanese Radiation Reach the United States?

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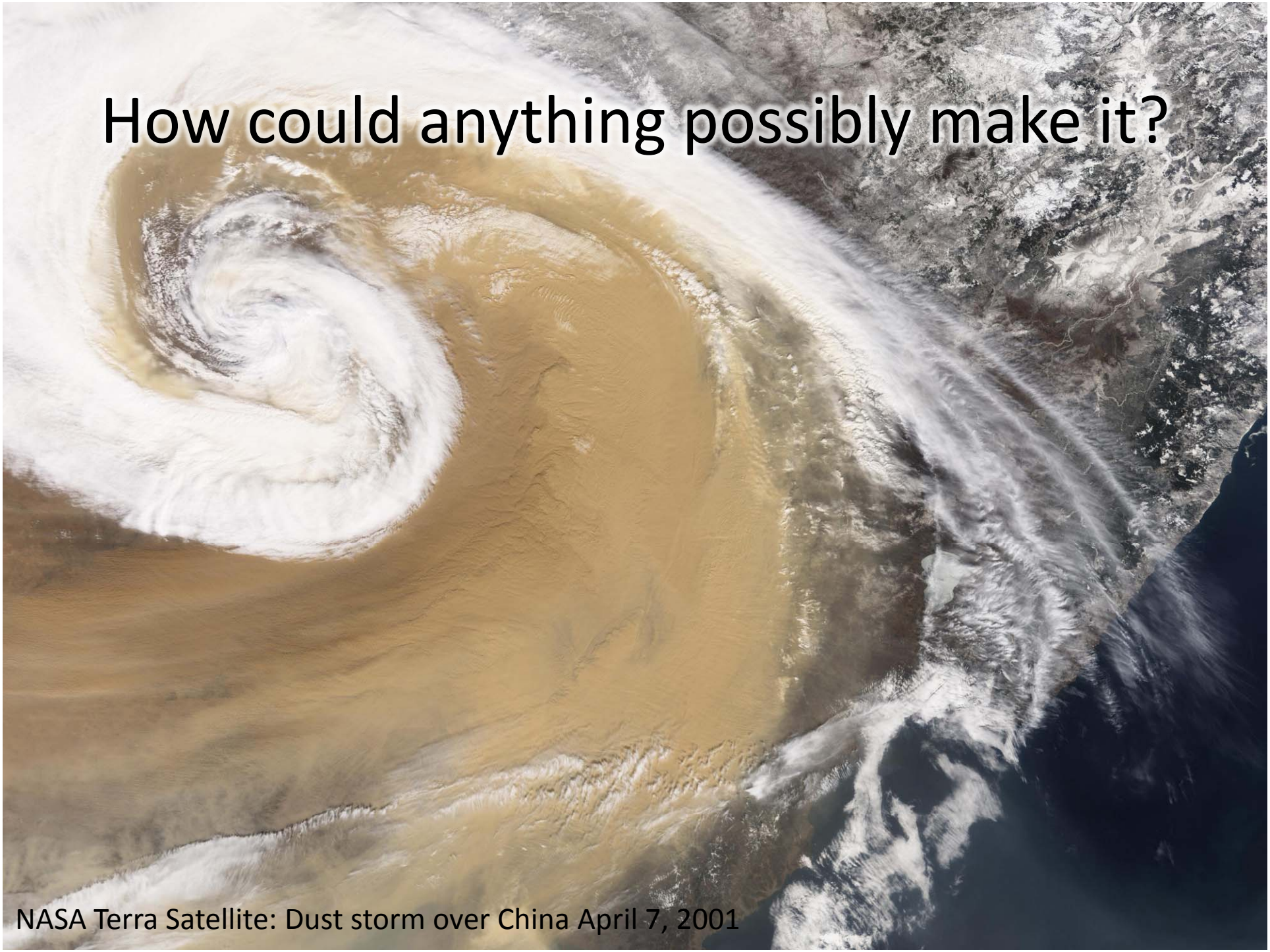
Spoiler!

- Will it get to the U.S.? It has.
- *What!? How much will get here?* Very little.
- *HOW!?!?*

How could anything possibly make it?

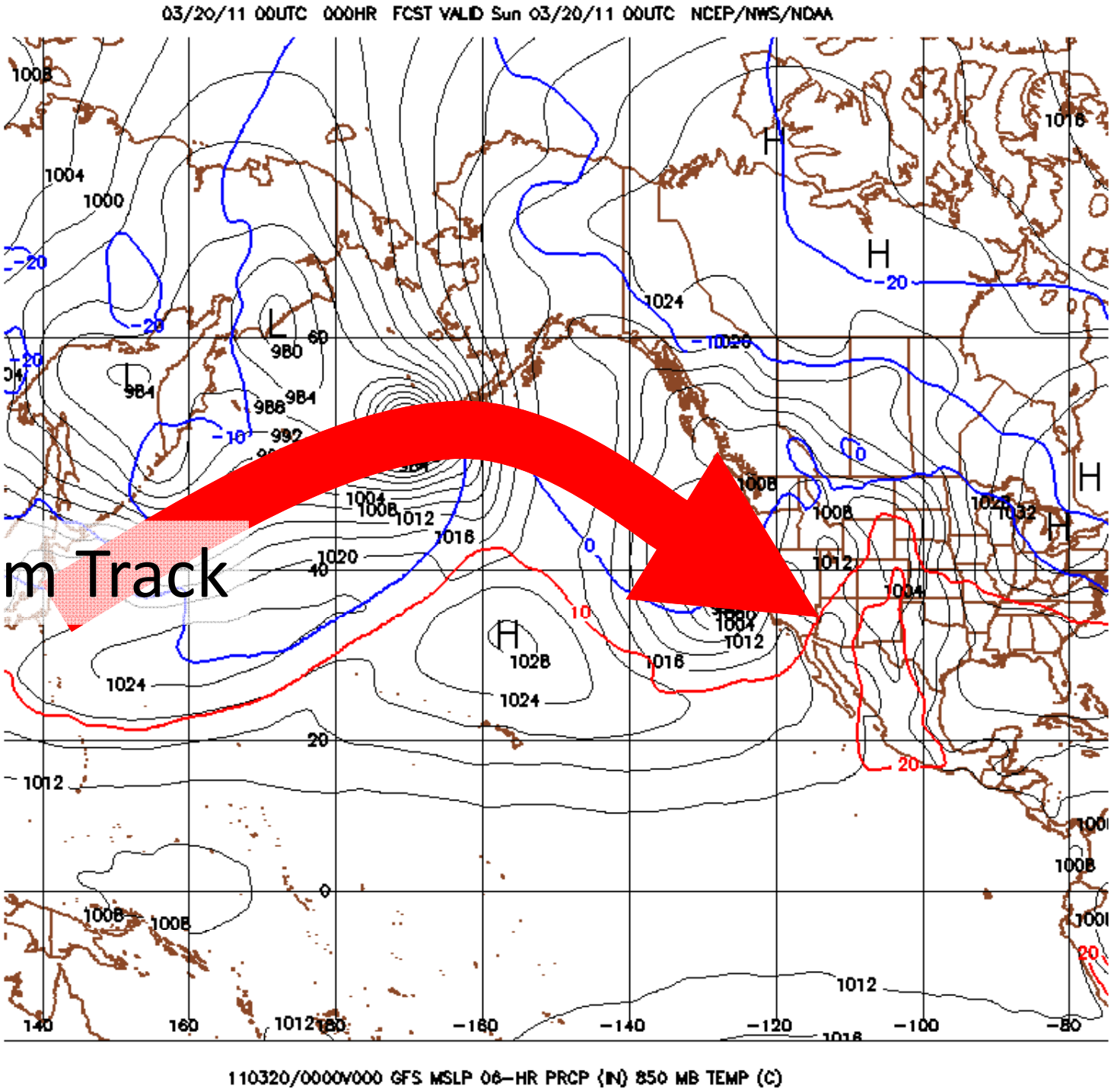


NASA Terra Satellite: Dust storm over China April 7, 2001

General Meteorology

- Japan is within the mid-latitude Westerlies this time of year
  - Westerlies $\Rightarrow$ winds that blow from west to east
- Springtime is a very active time of year for Japan, with frequent storm systems making prolonged stagnation unlikely
  - This is good for Japan
- Tends to push pollution out into the open Pacific
  - This is good for everyone*

*Relatively speaking.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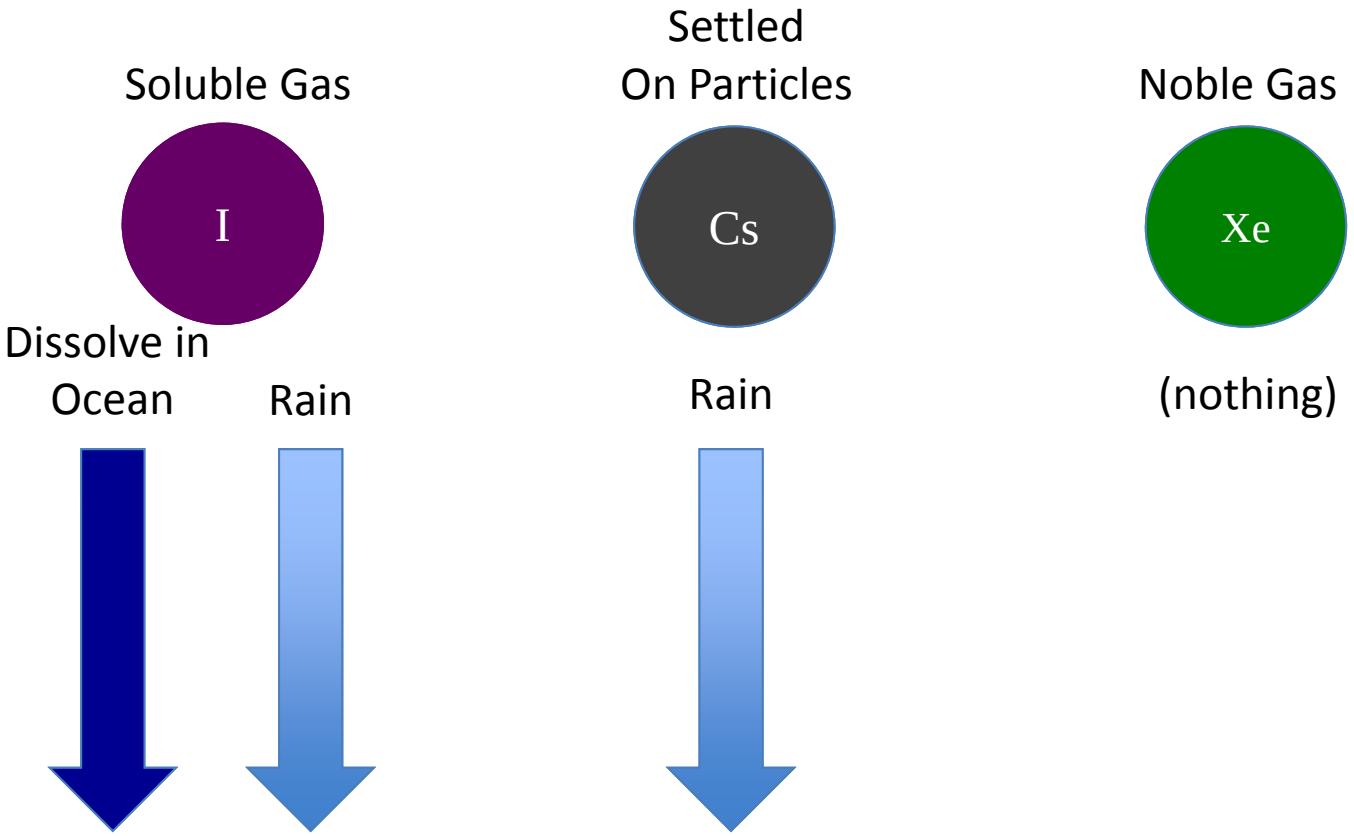
Storm Track
110320/0000V000 GFS MSLP 06-HR PRCP (IN) 850 MB TEMP (C)

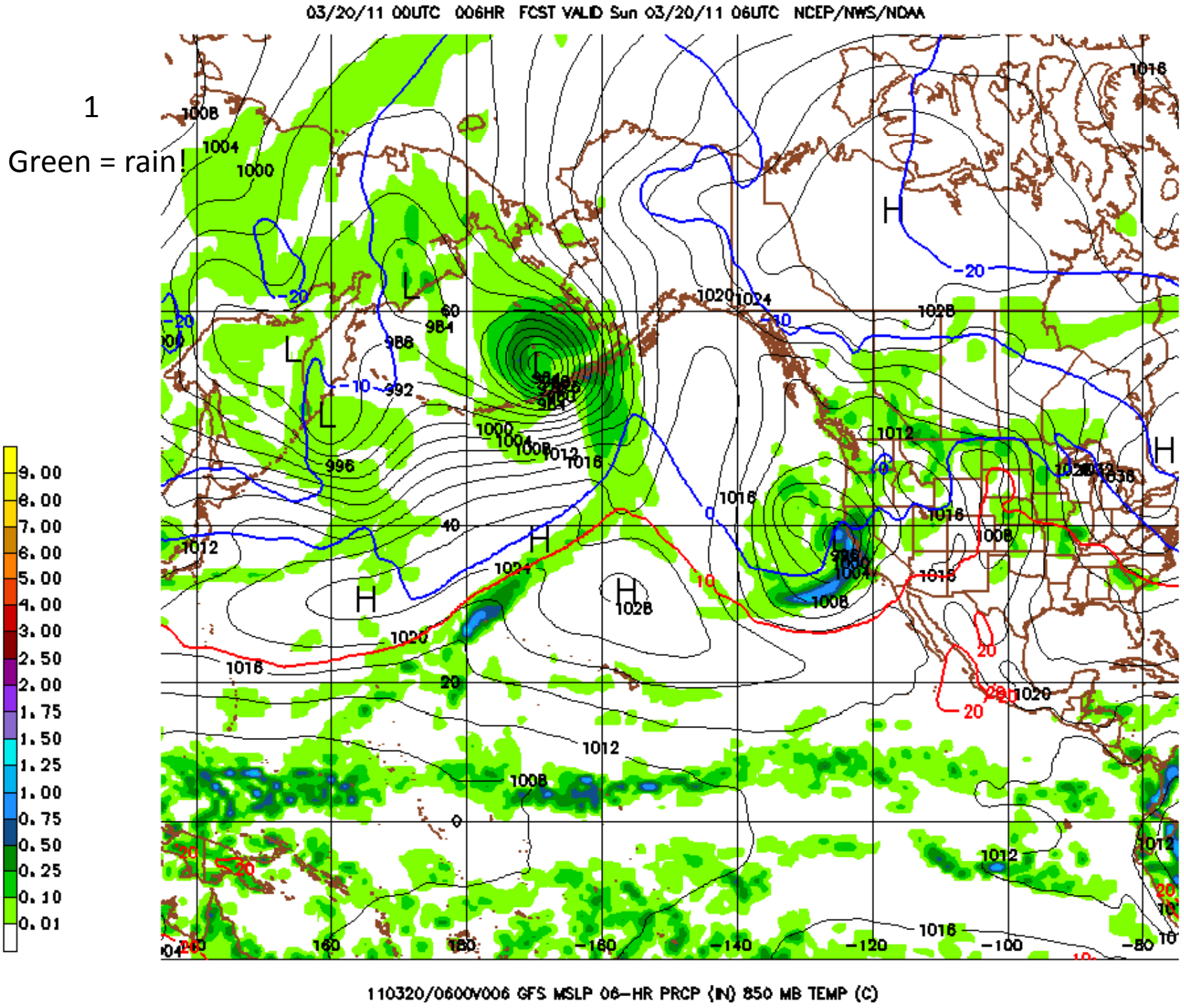
Elements Affected Differently



Depending on their physical & chemical forms, different materials deposit differently

1

Green = rain!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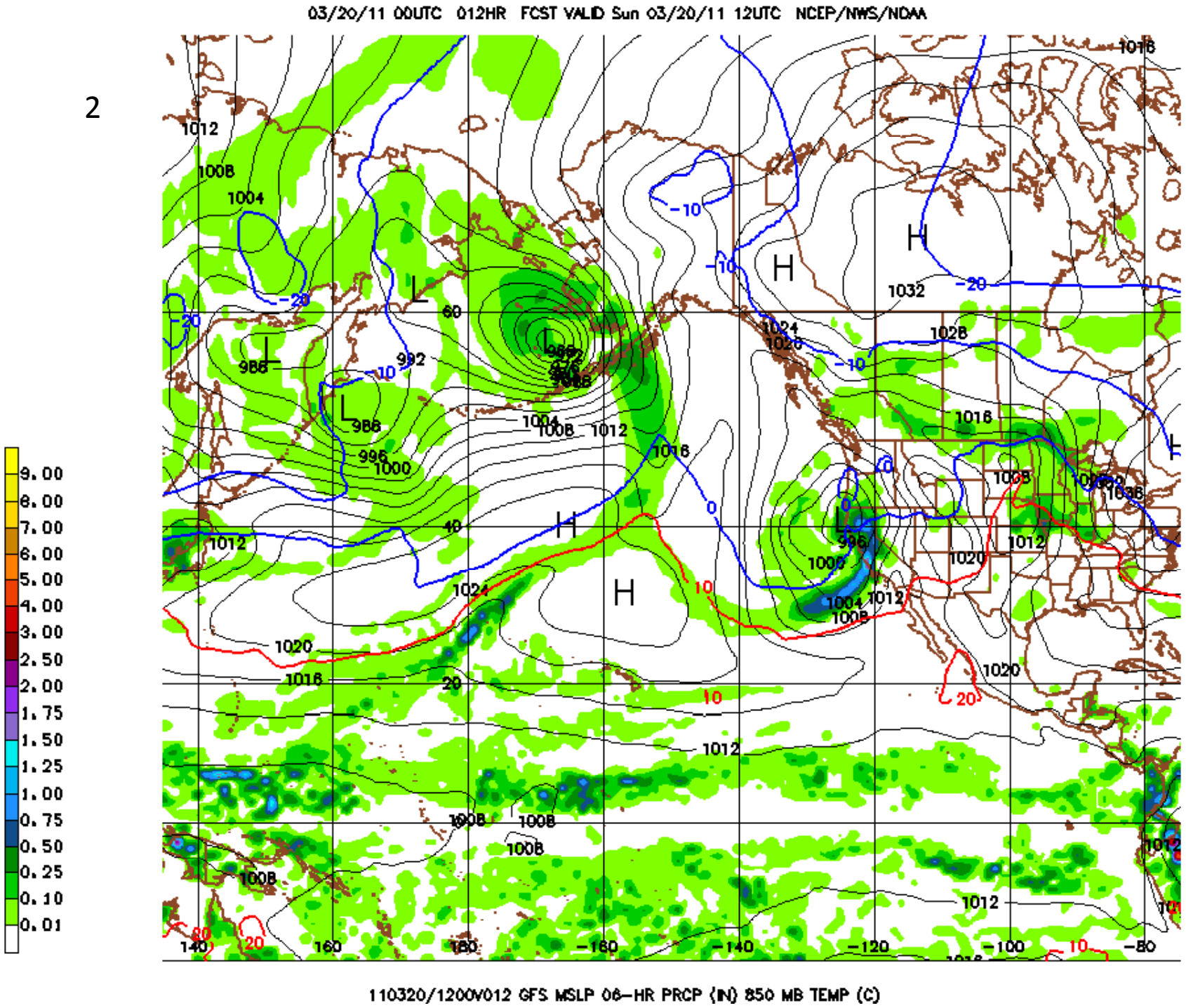
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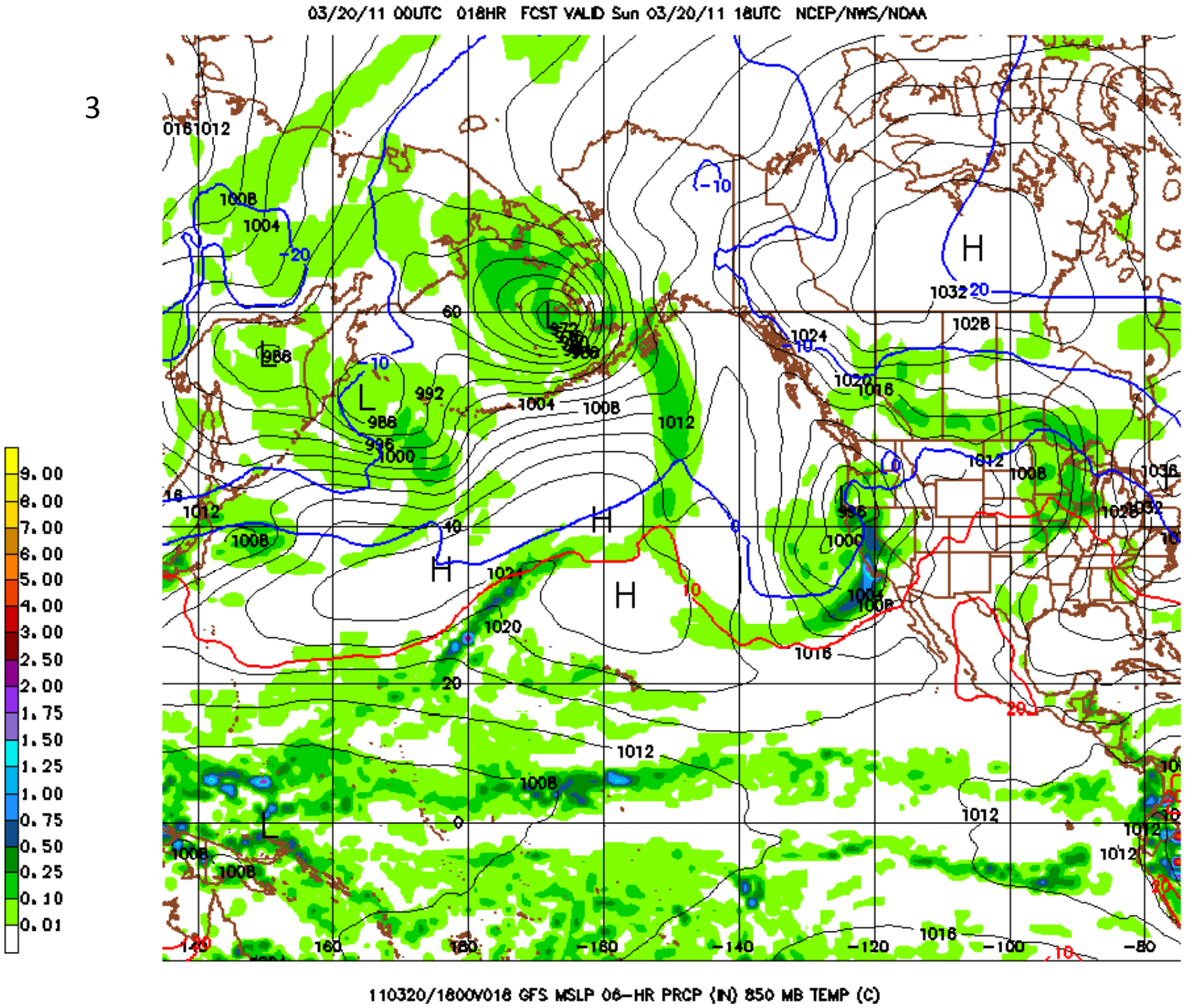
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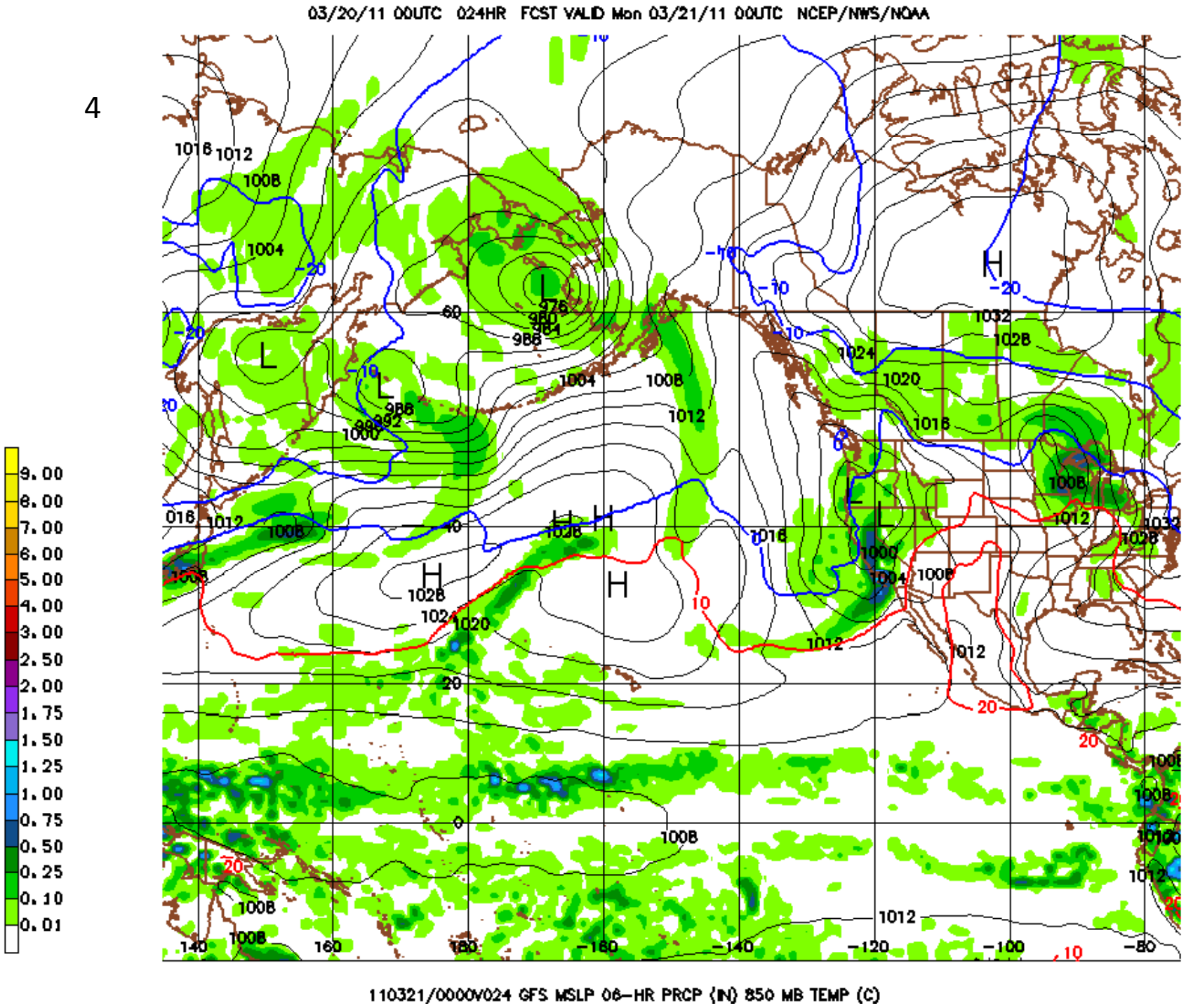
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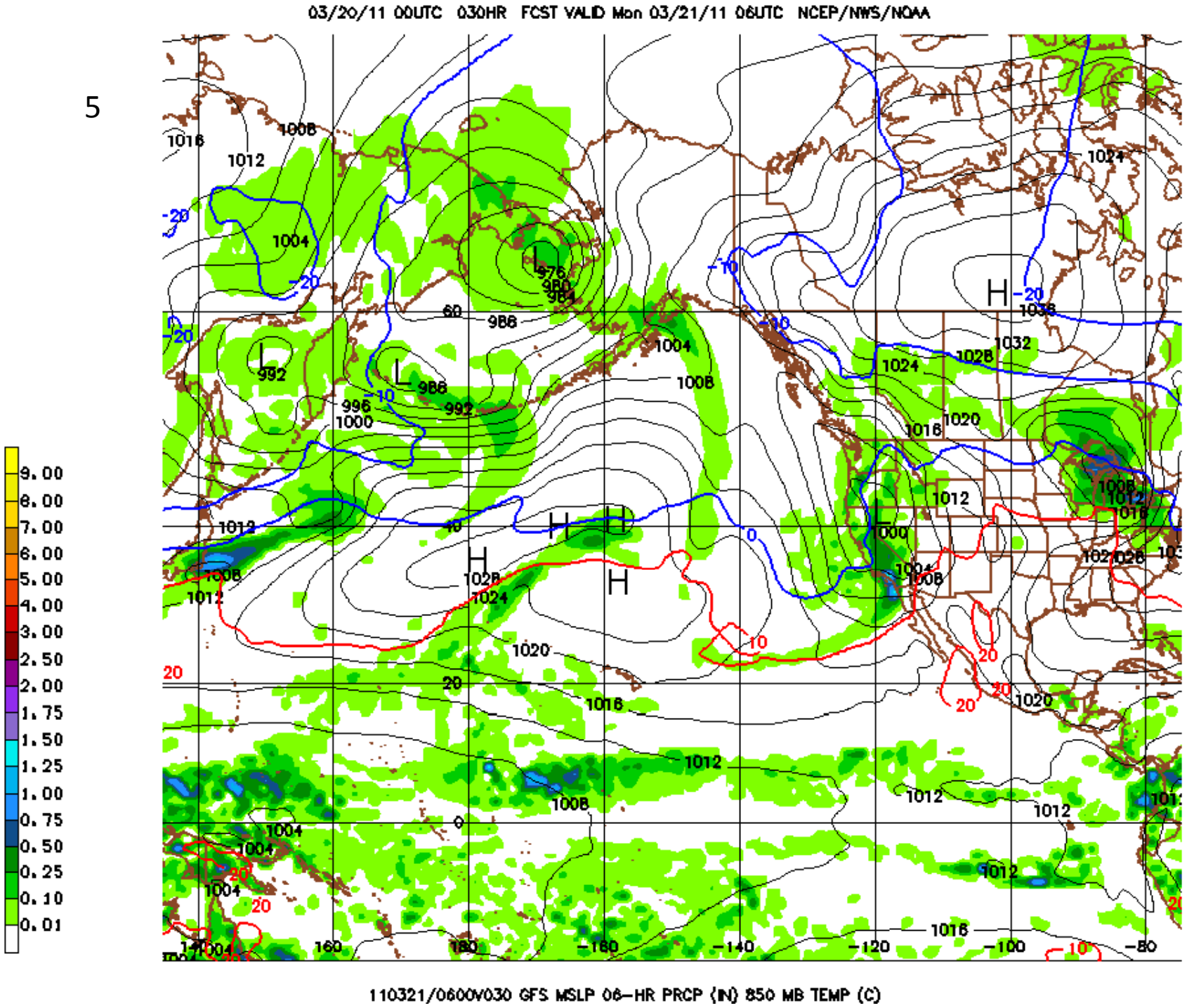
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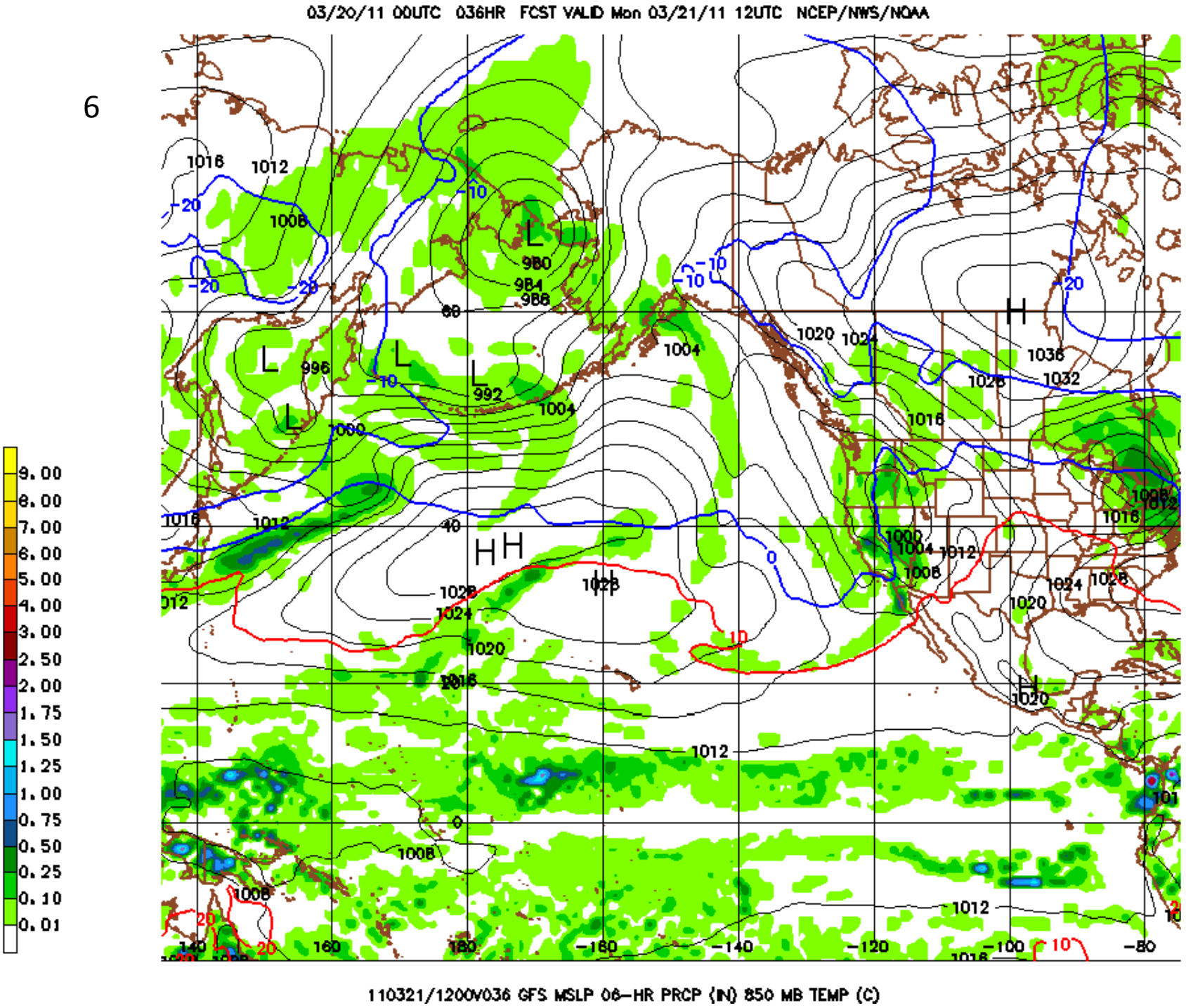
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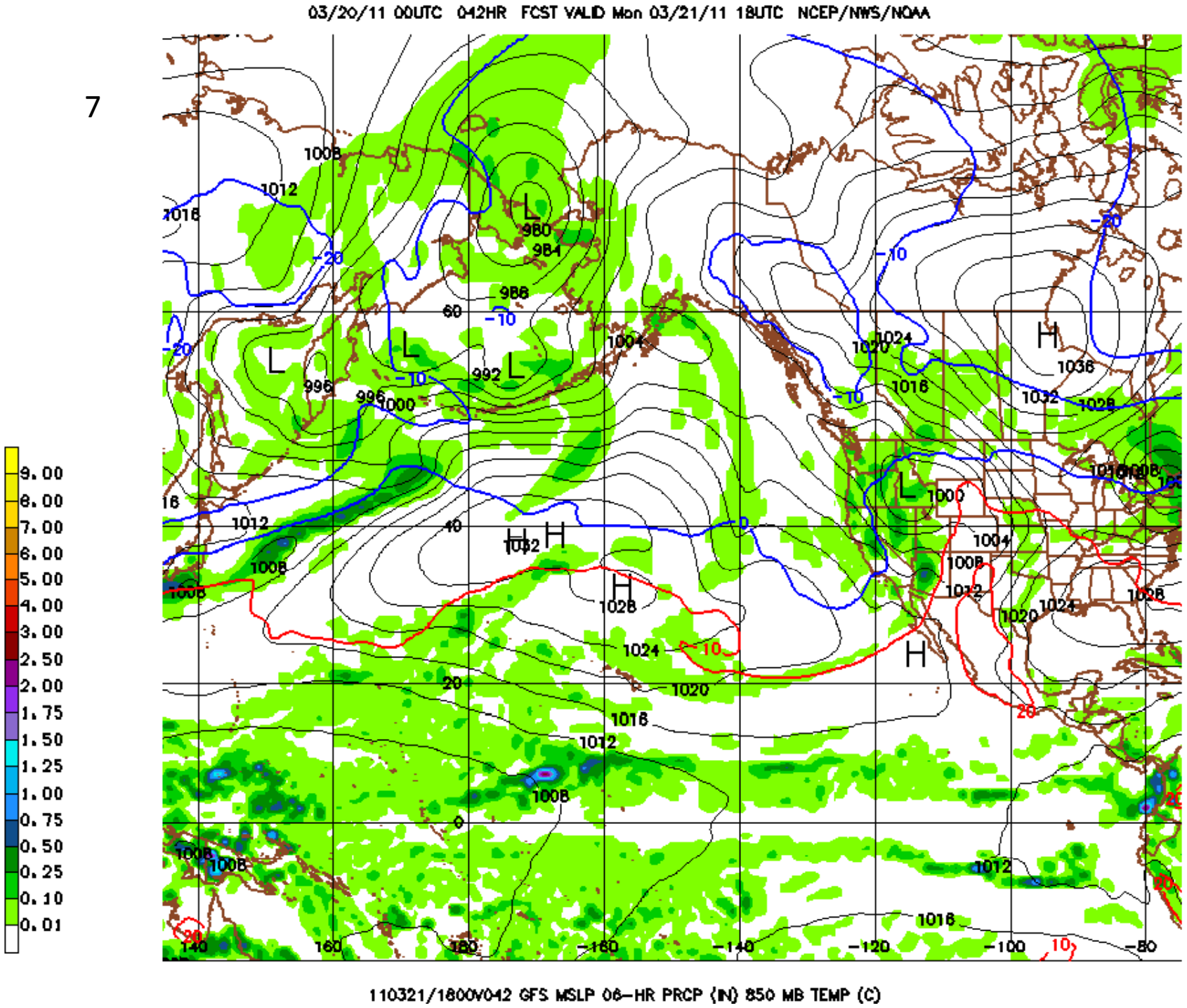
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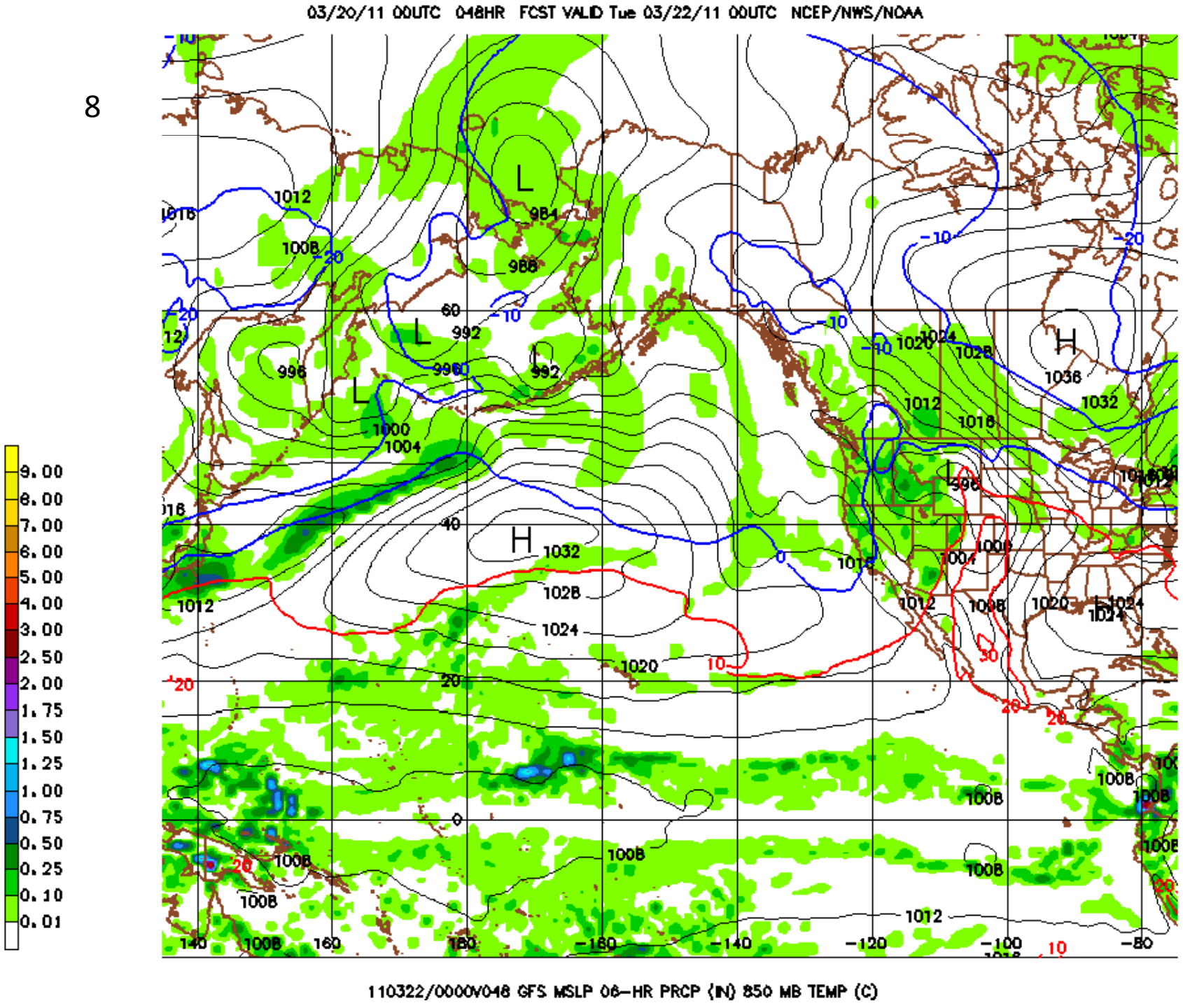
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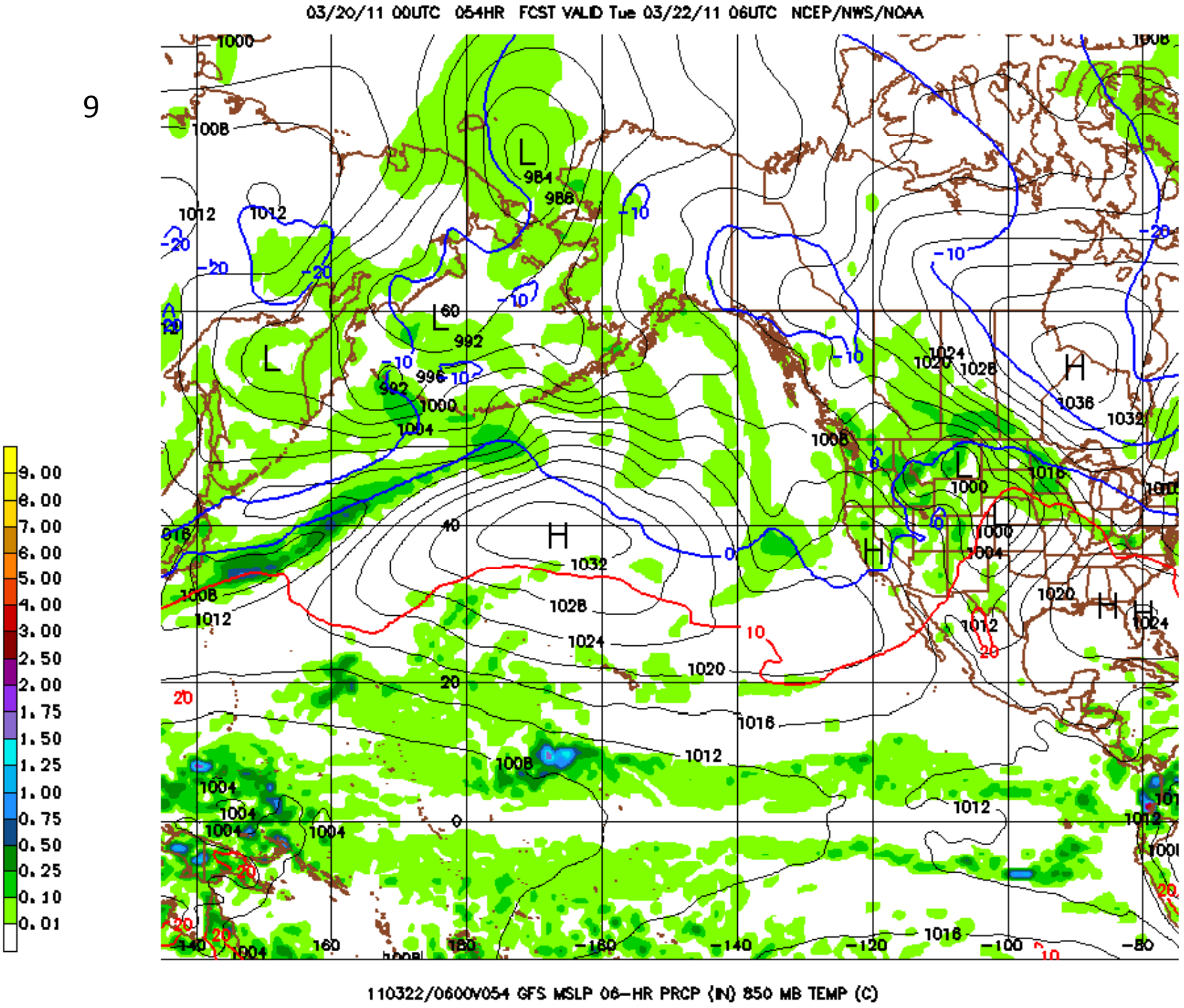
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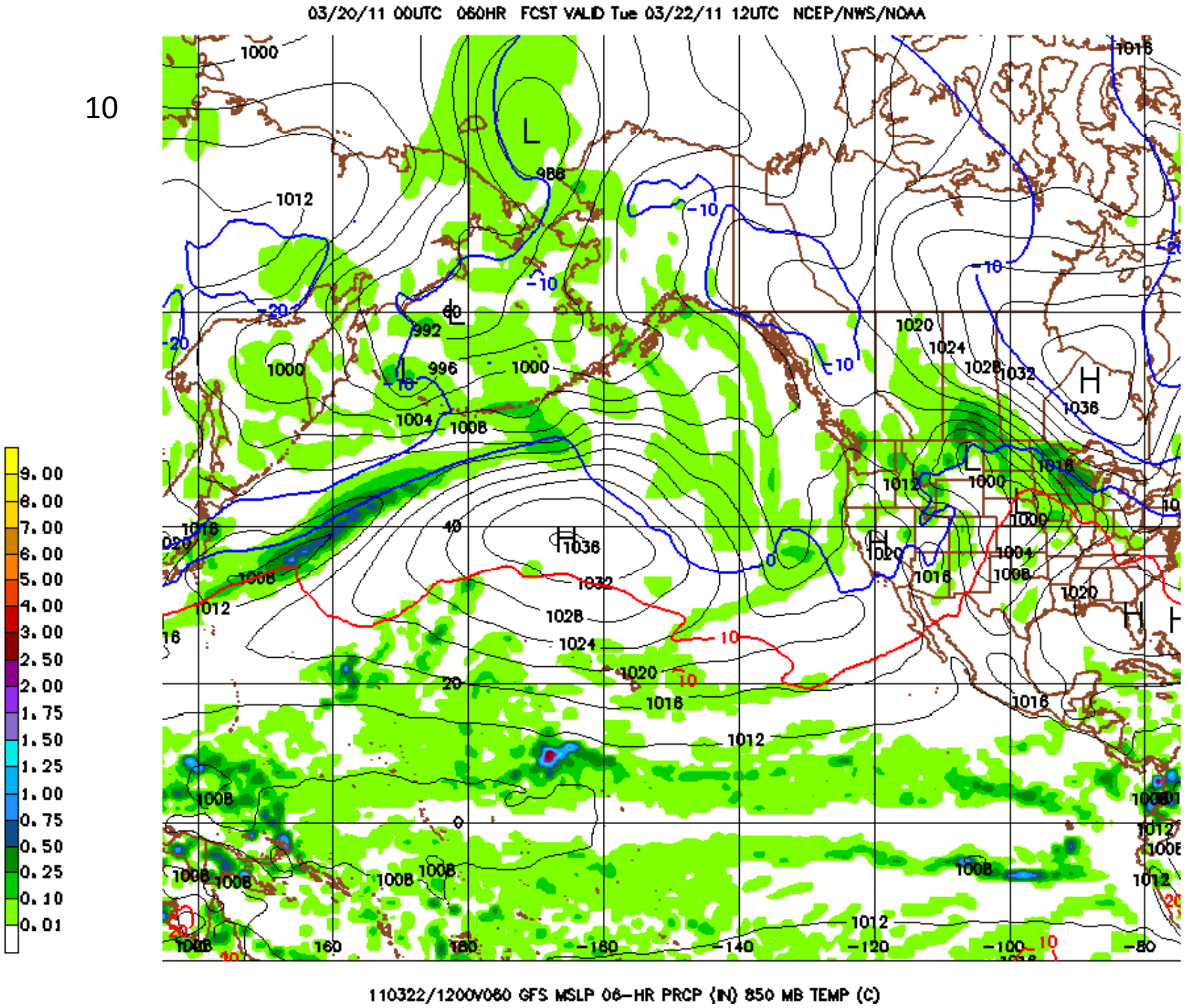
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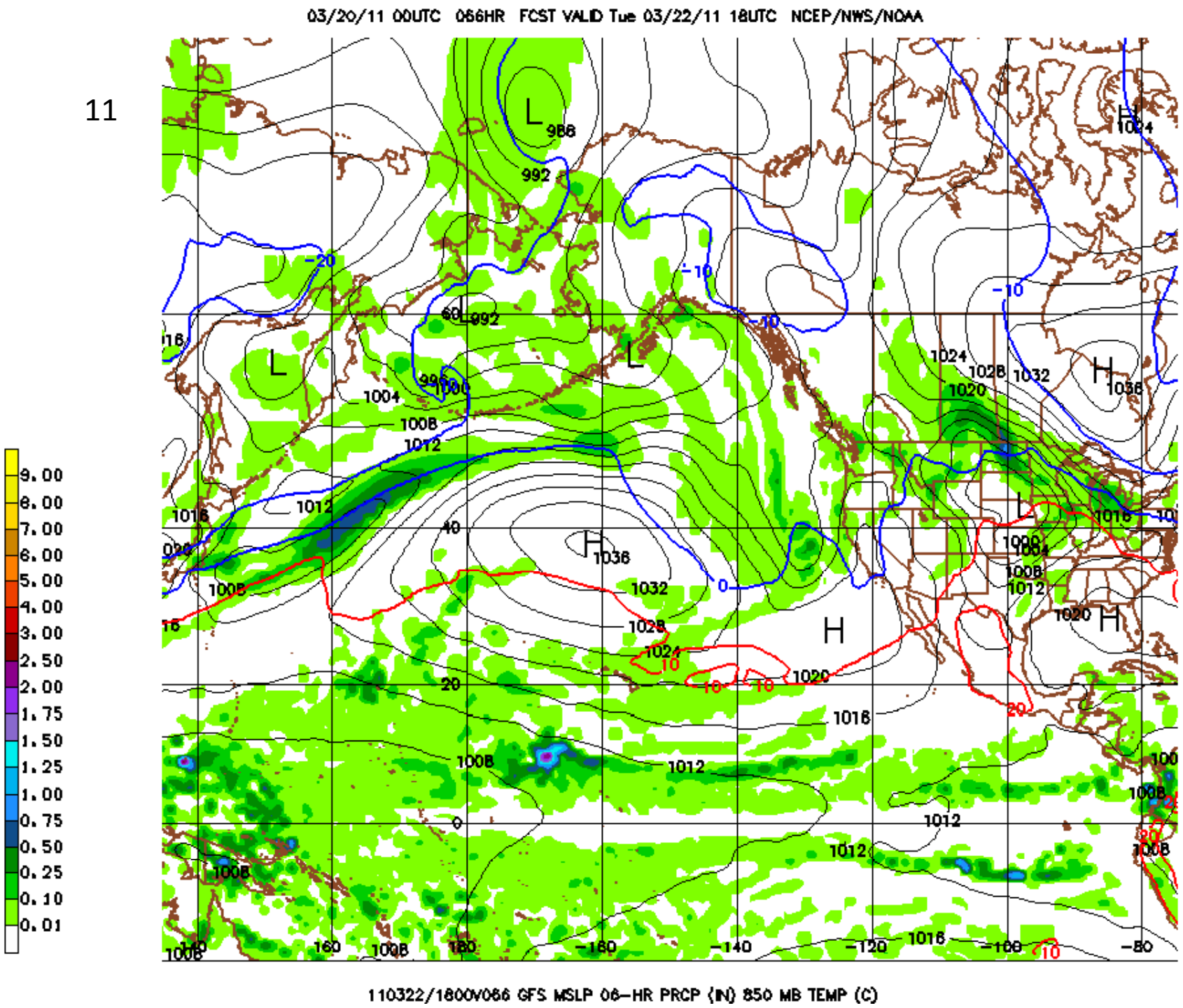
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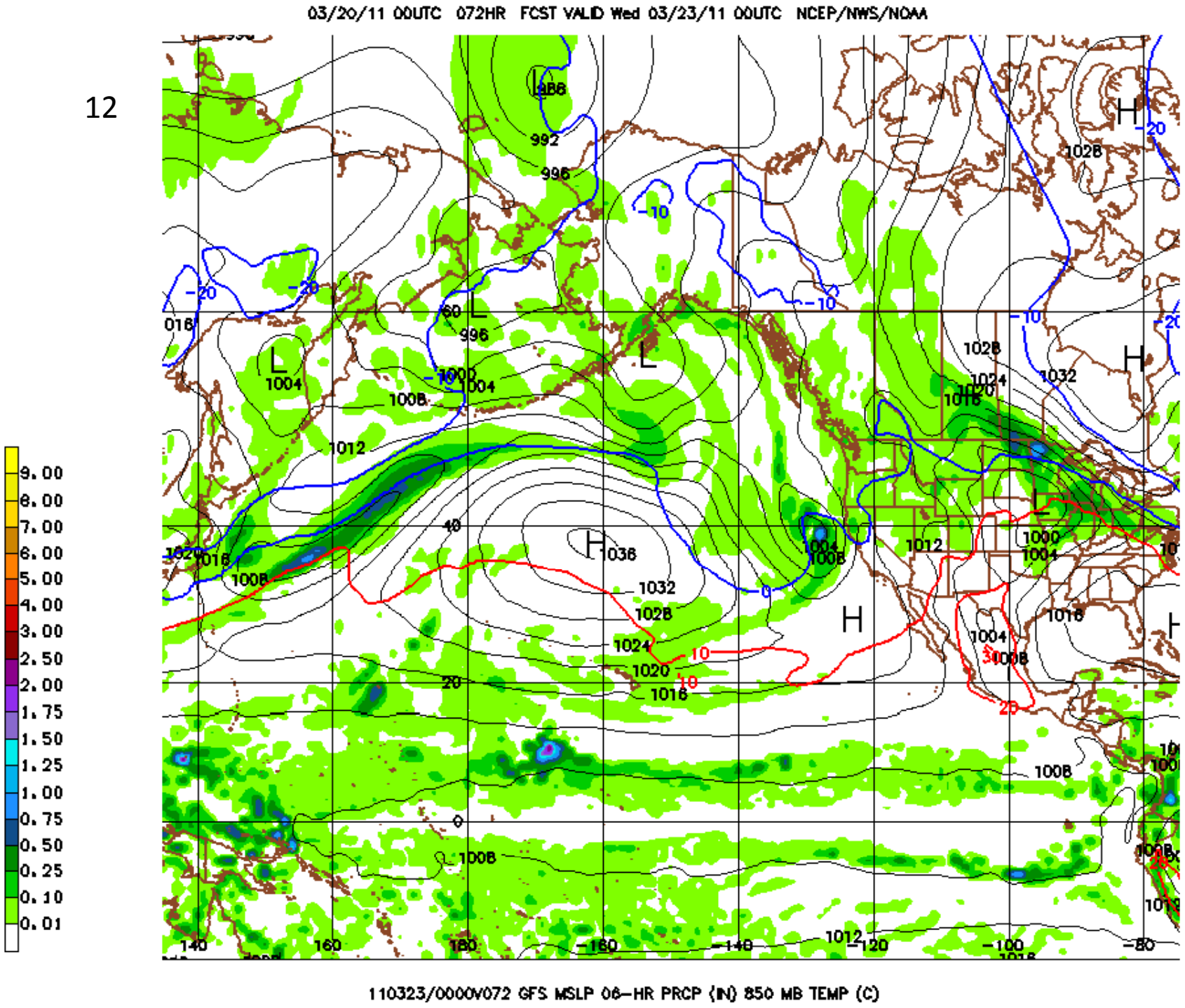
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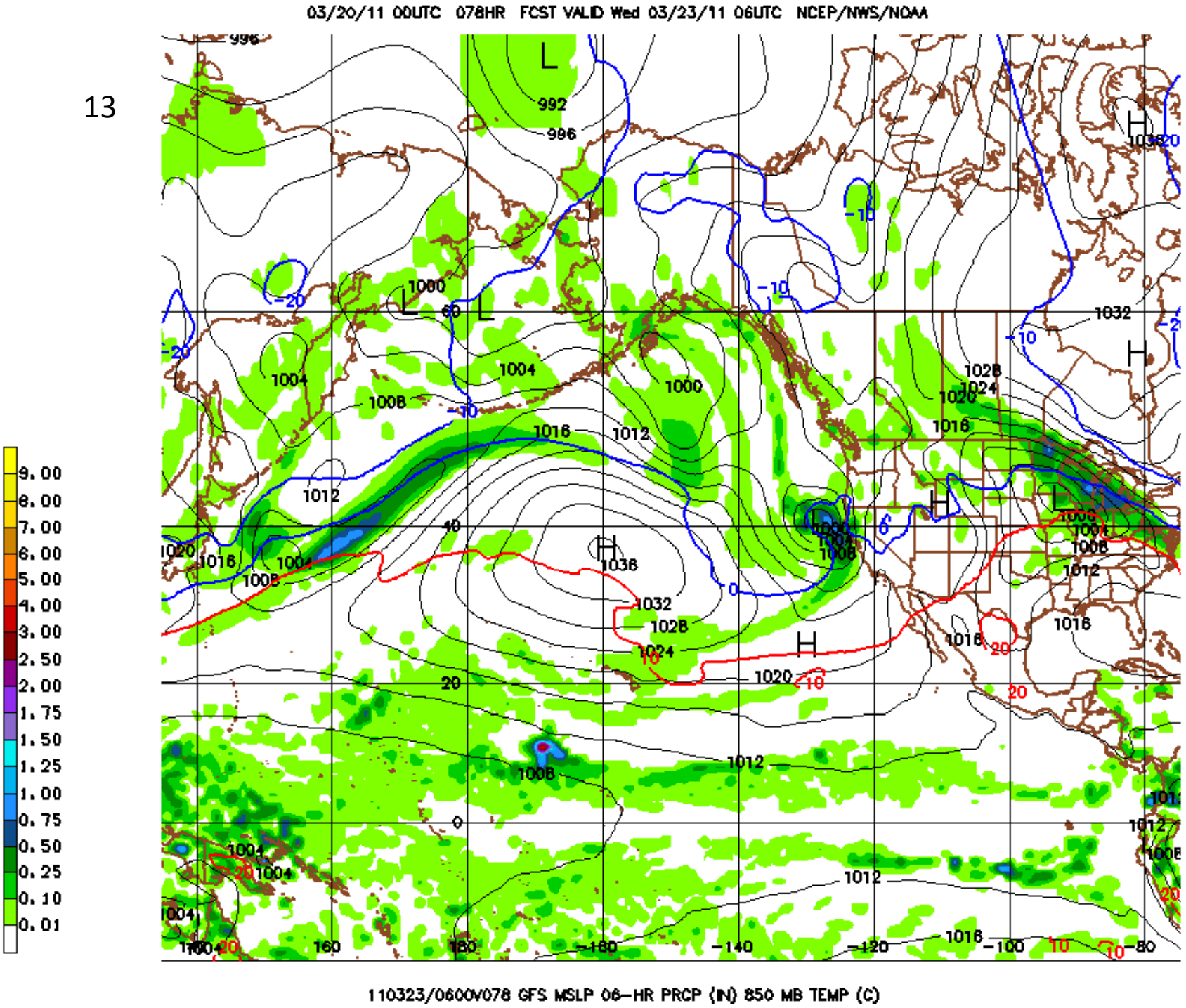
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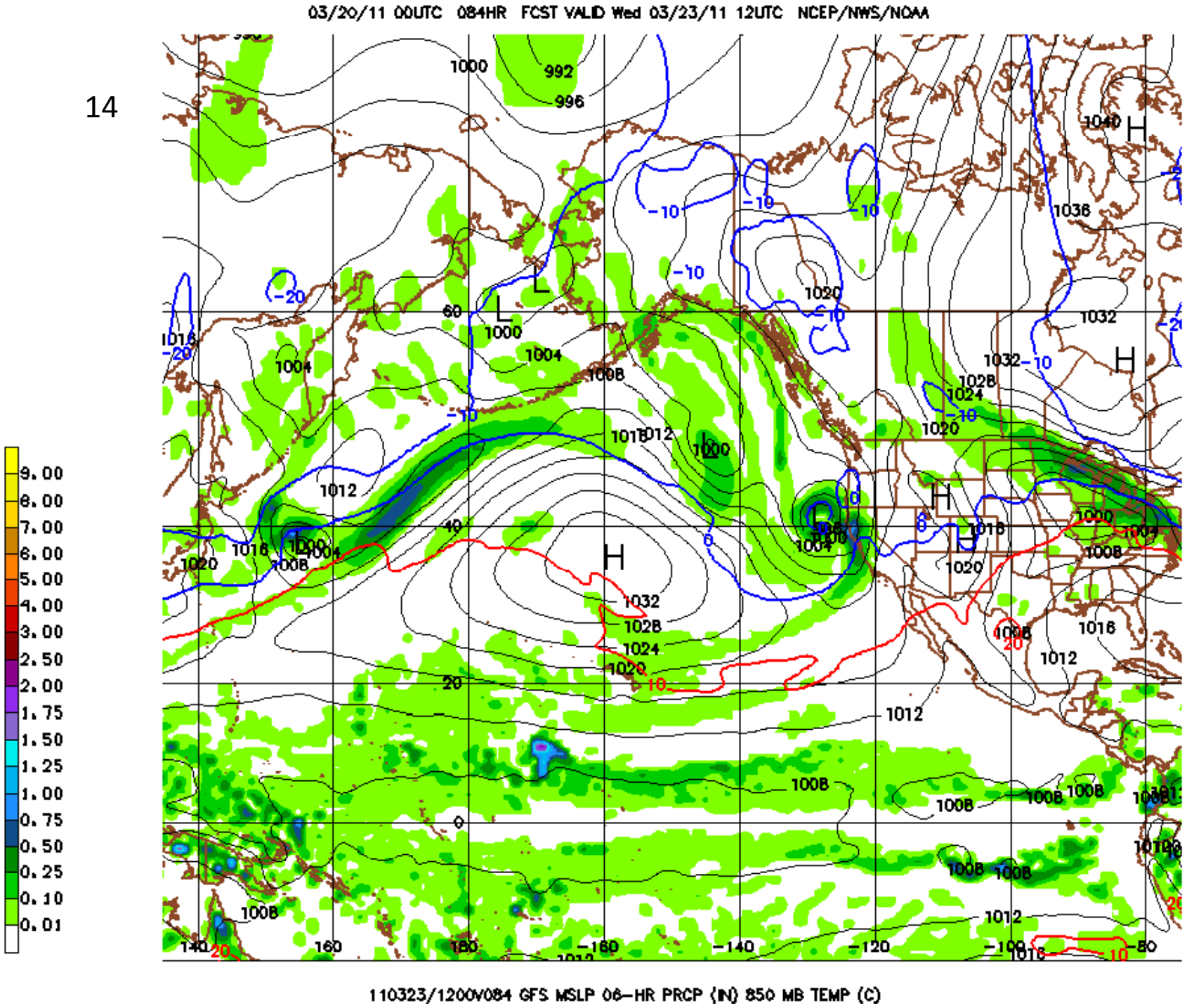
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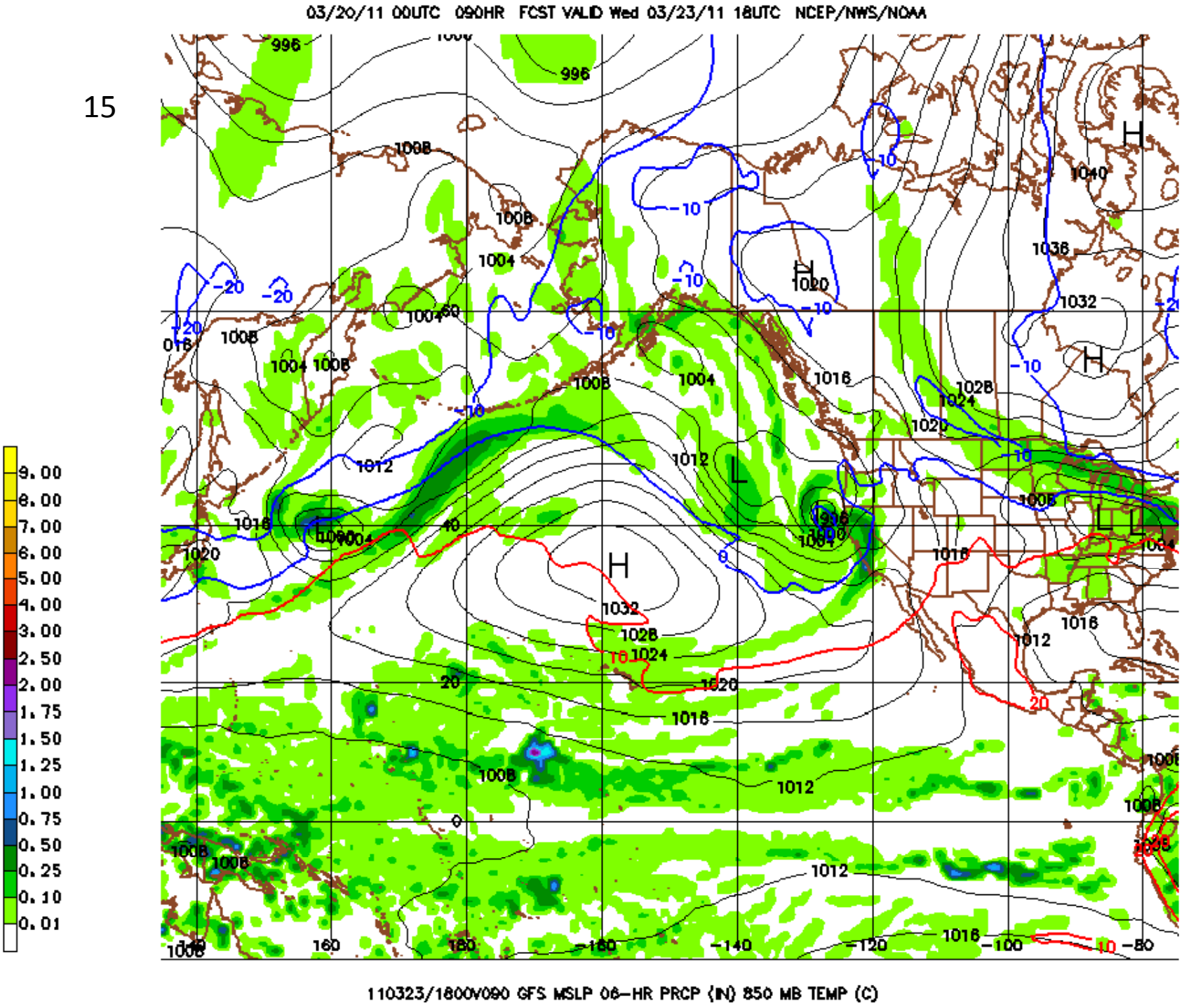
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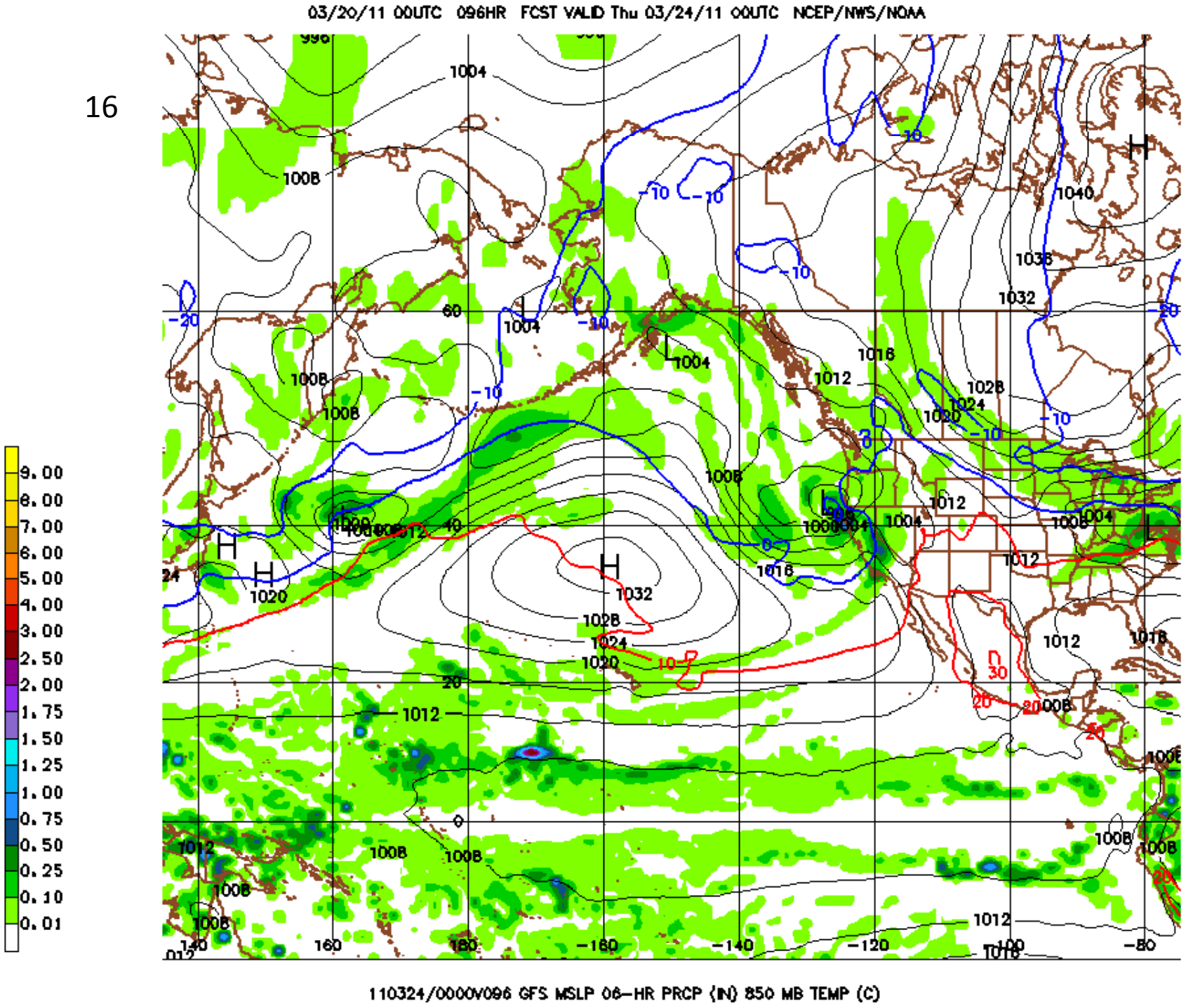
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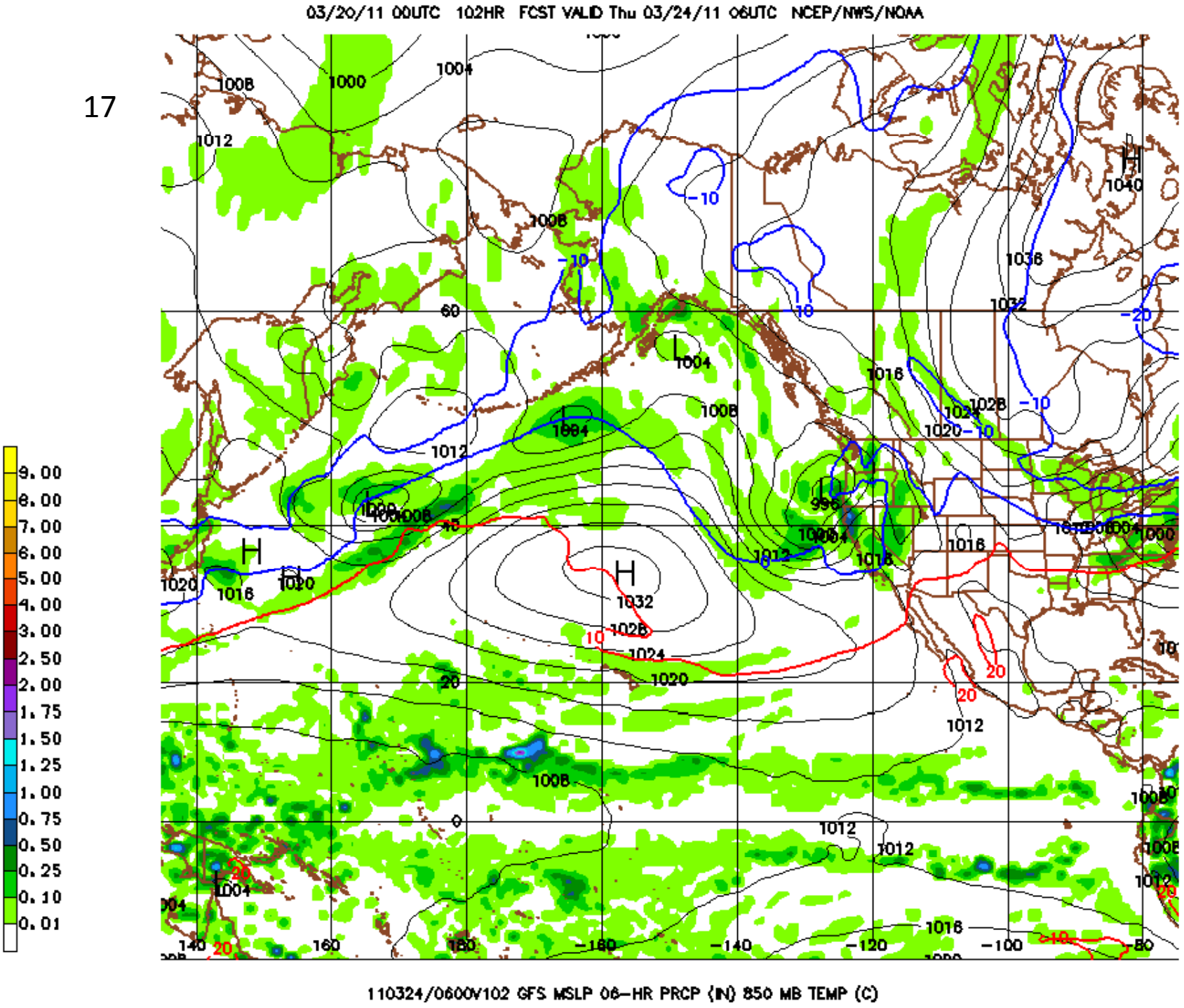
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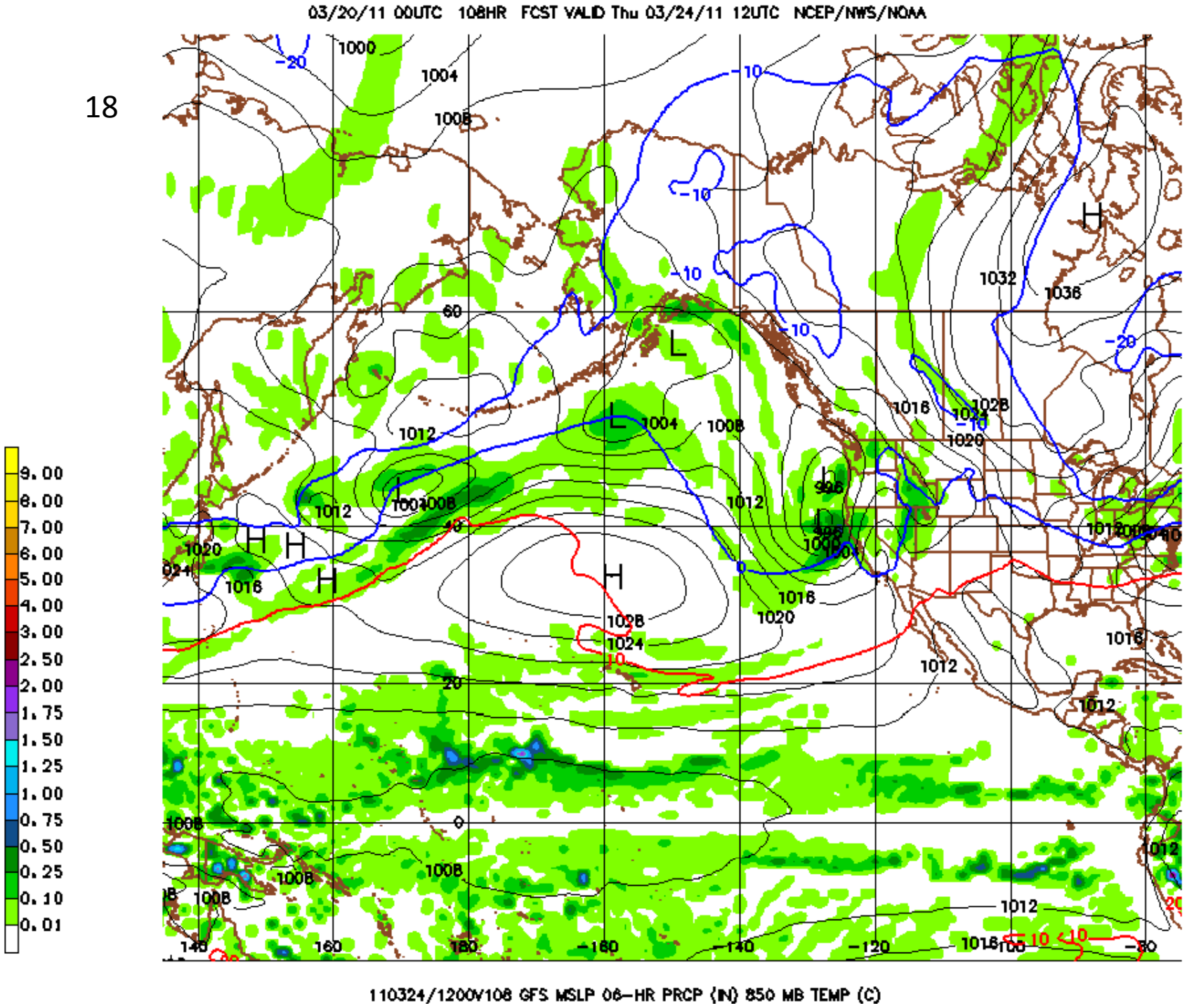
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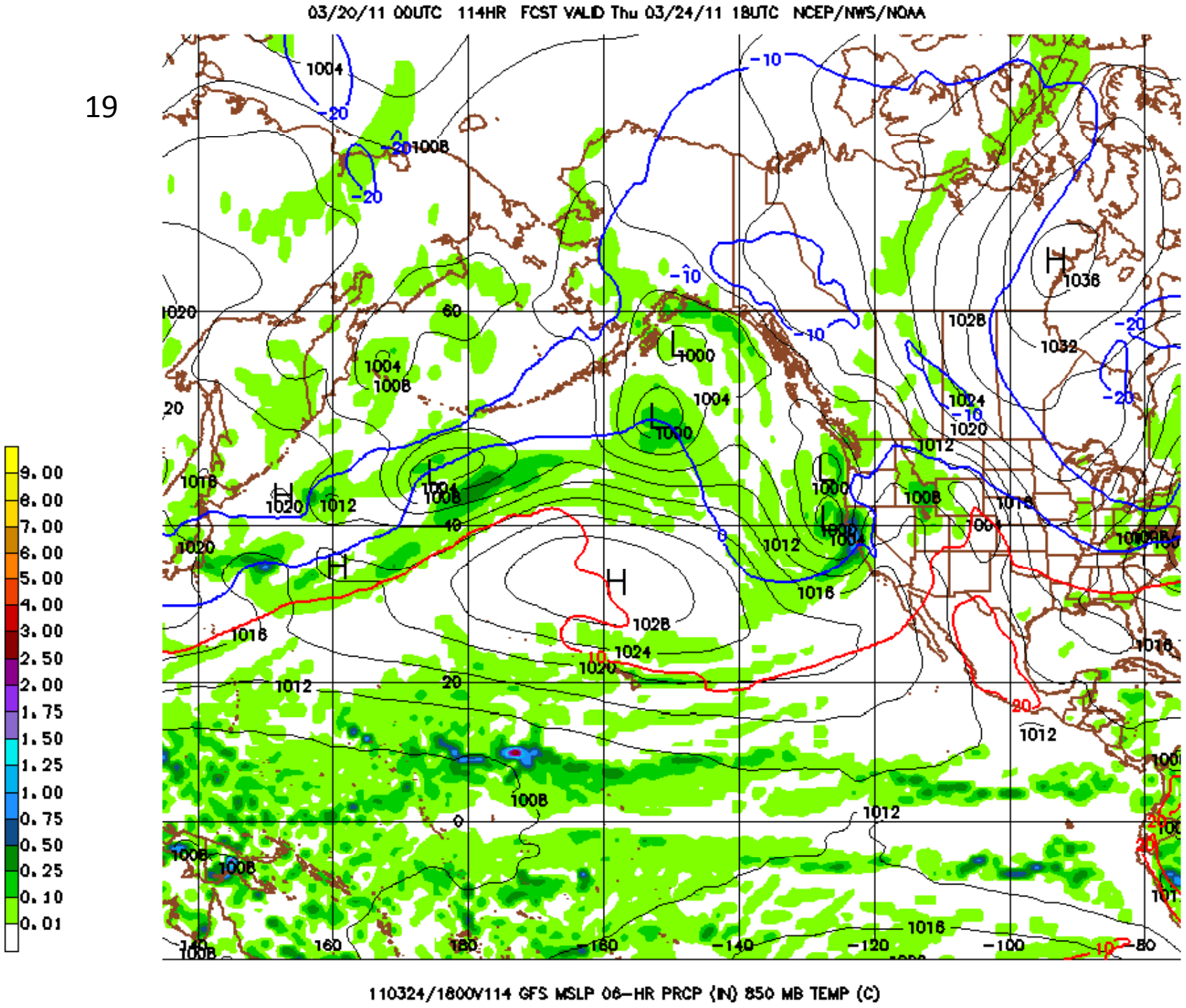
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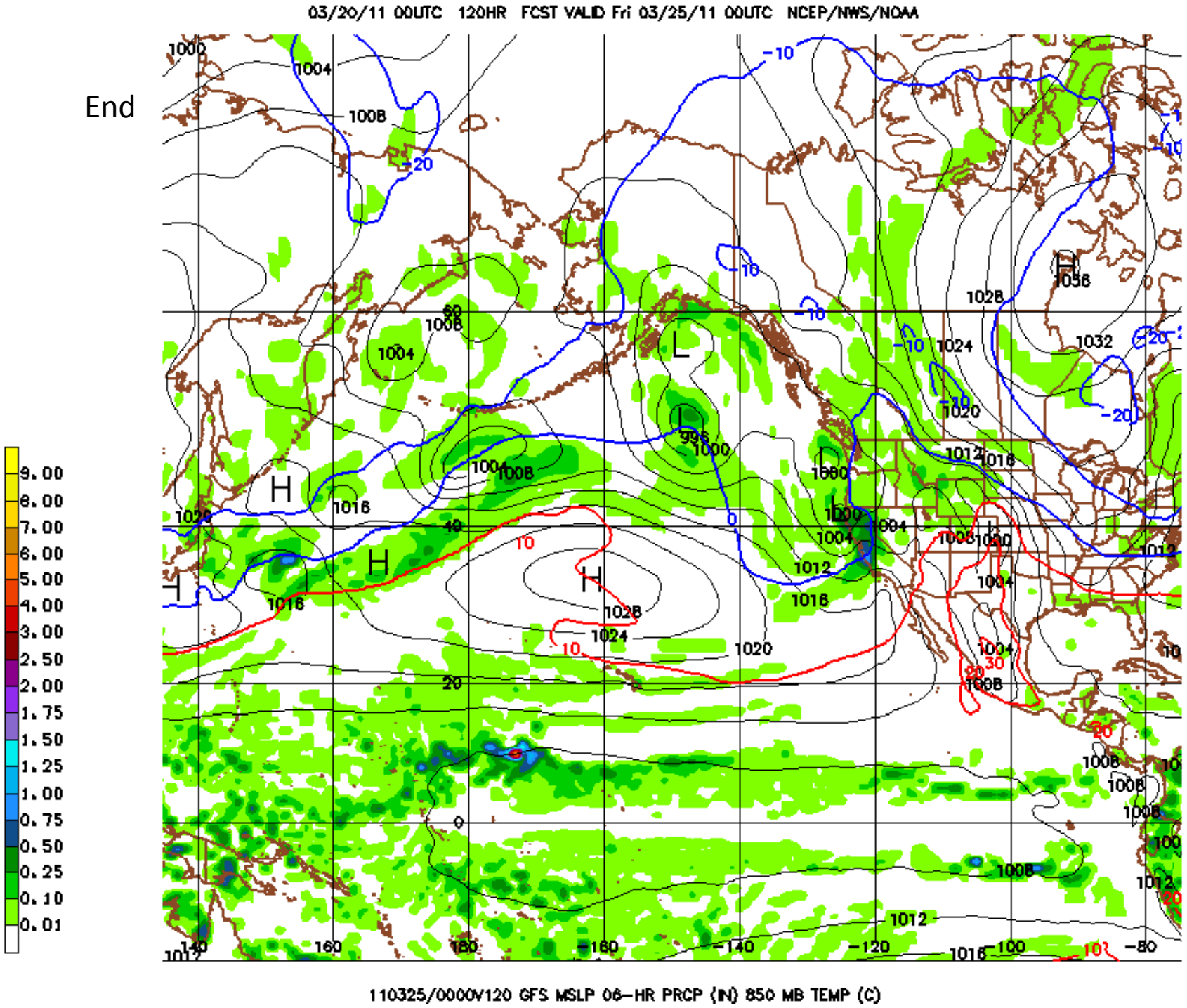
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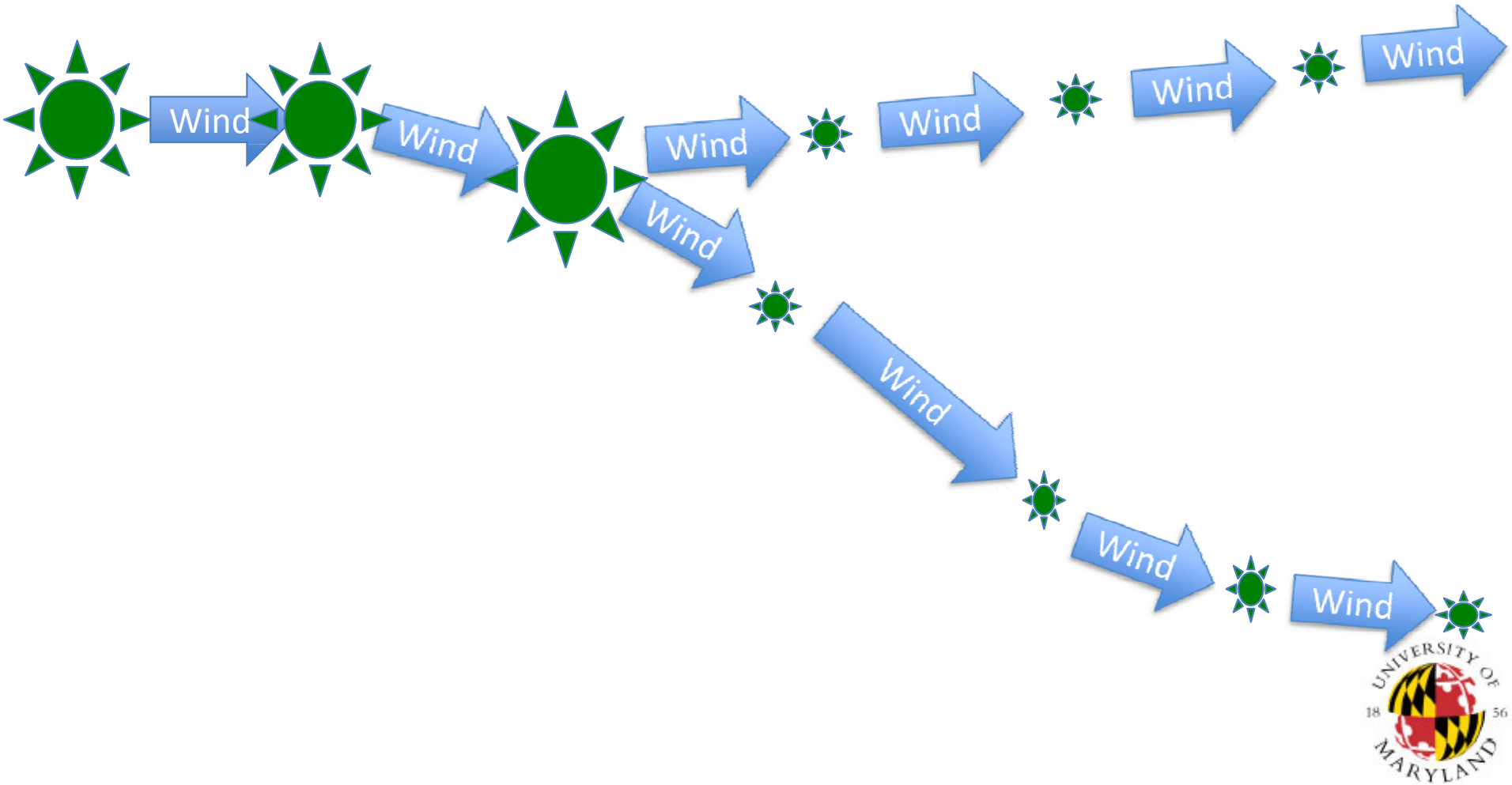
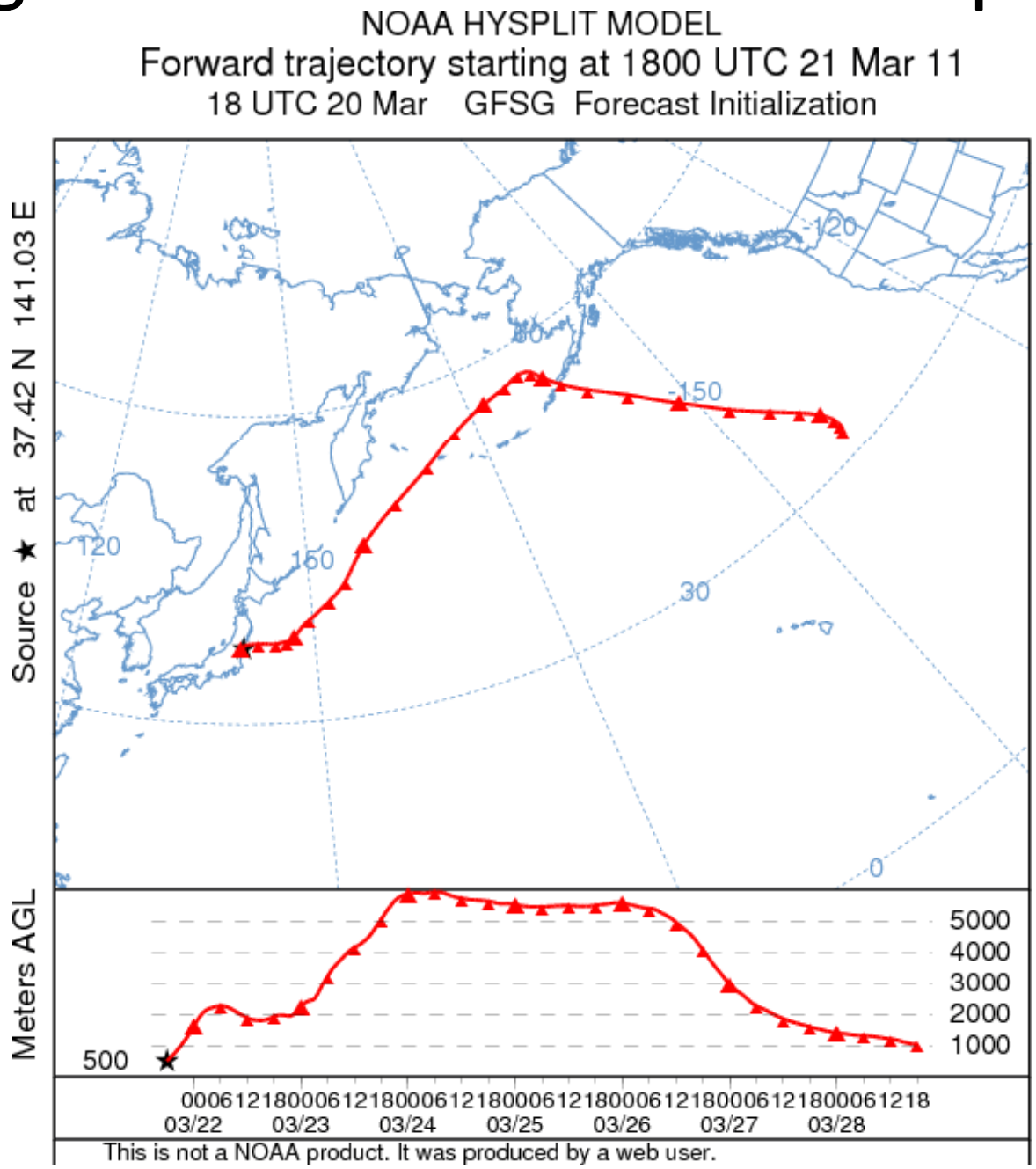
Tracking Plumes

- It takes about 3-7 days for air to reach the West Coast of the U.S. from Japan.
- How do we calculate where the air goes and how fast it gets there?
  - Winds, rain, weather
  - Plume height

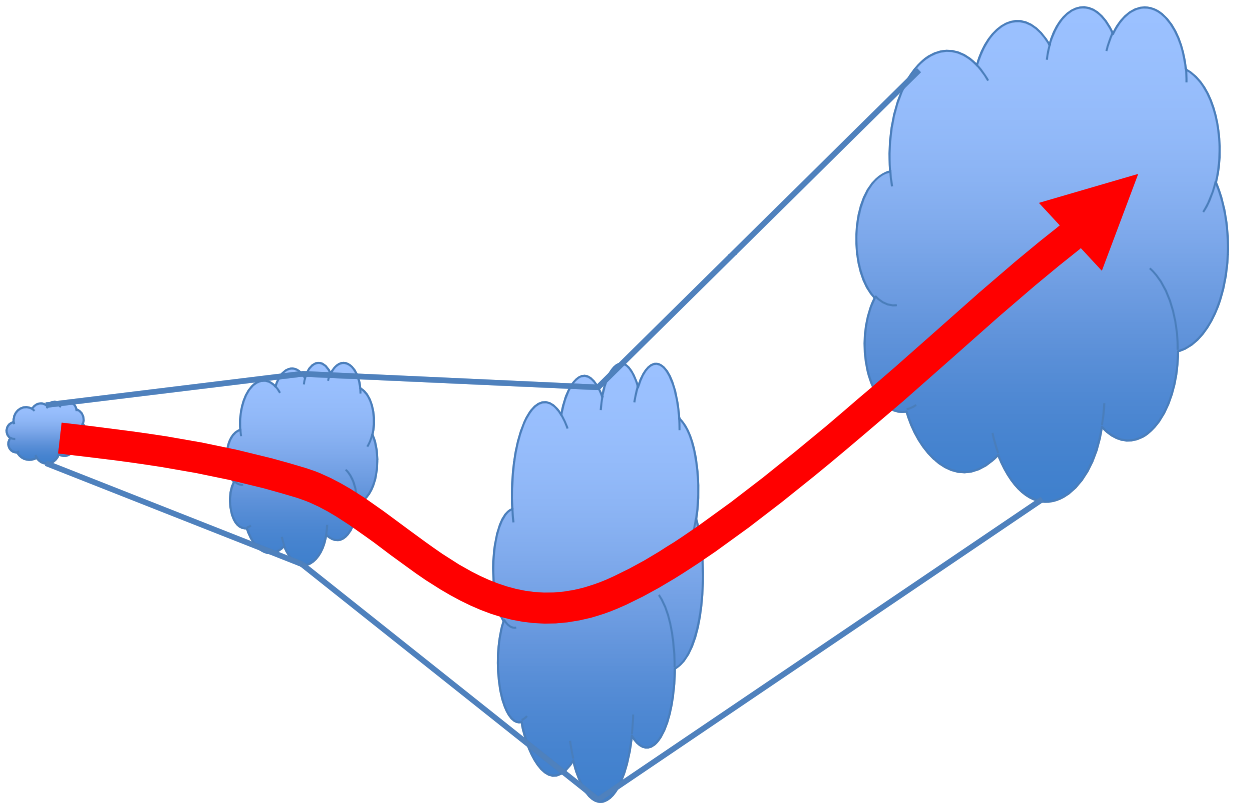
Use All Available Weather Data & Put a Plume in a Model



We get a line that follows the plume

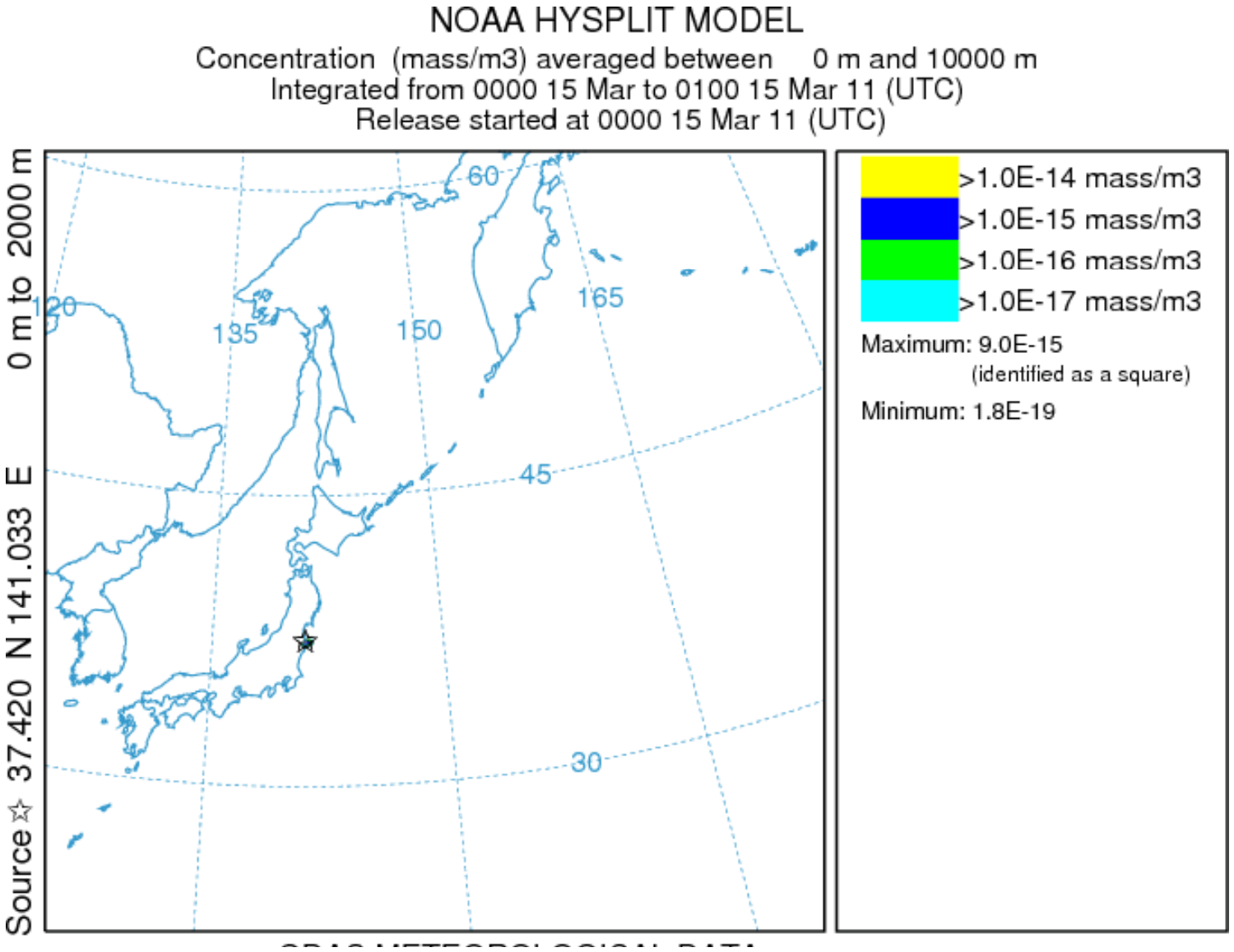


How accurate are the forecasts?

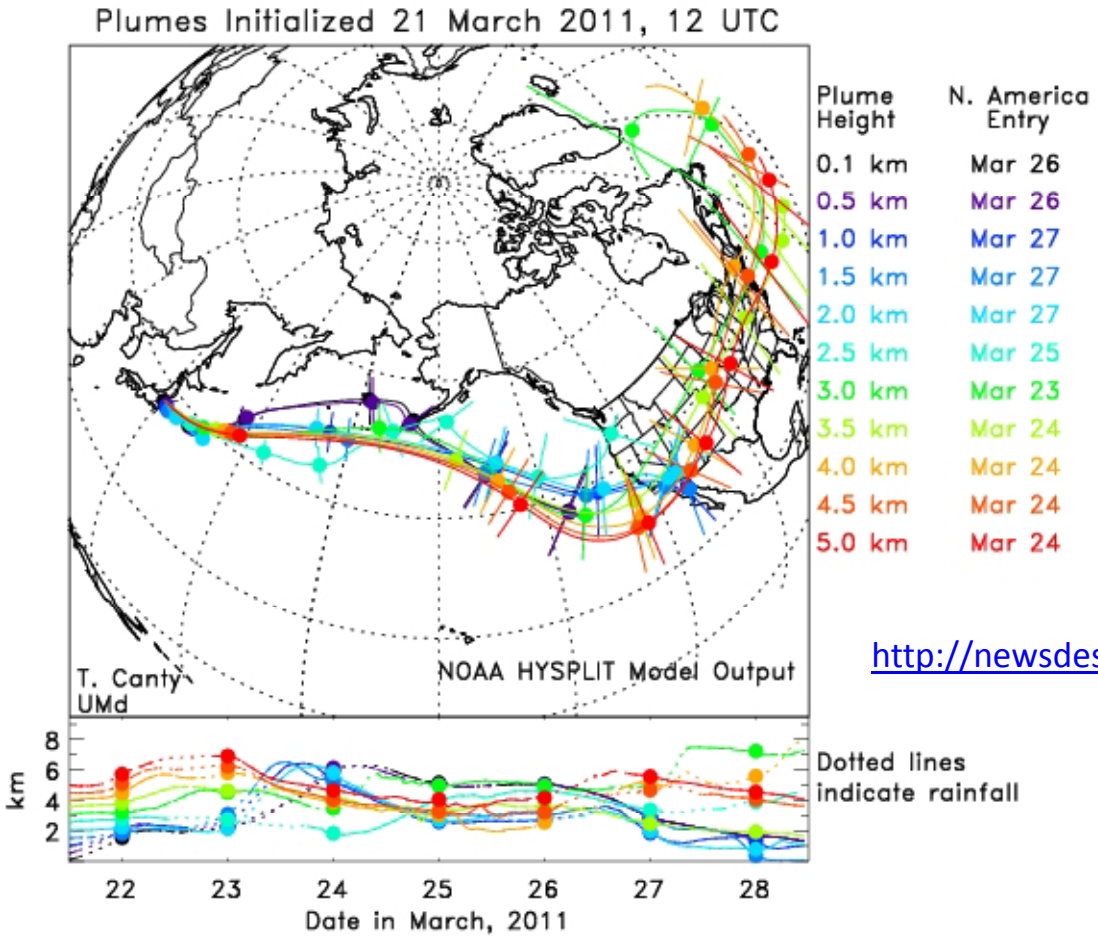


The HYSPLIT lines describe the center of a wiggly cone

This is what the plumes really look like: follow a 24 hour release



Forecast Monitoring



http://www.atmos.umd.edu/~tcanty/hysplit/

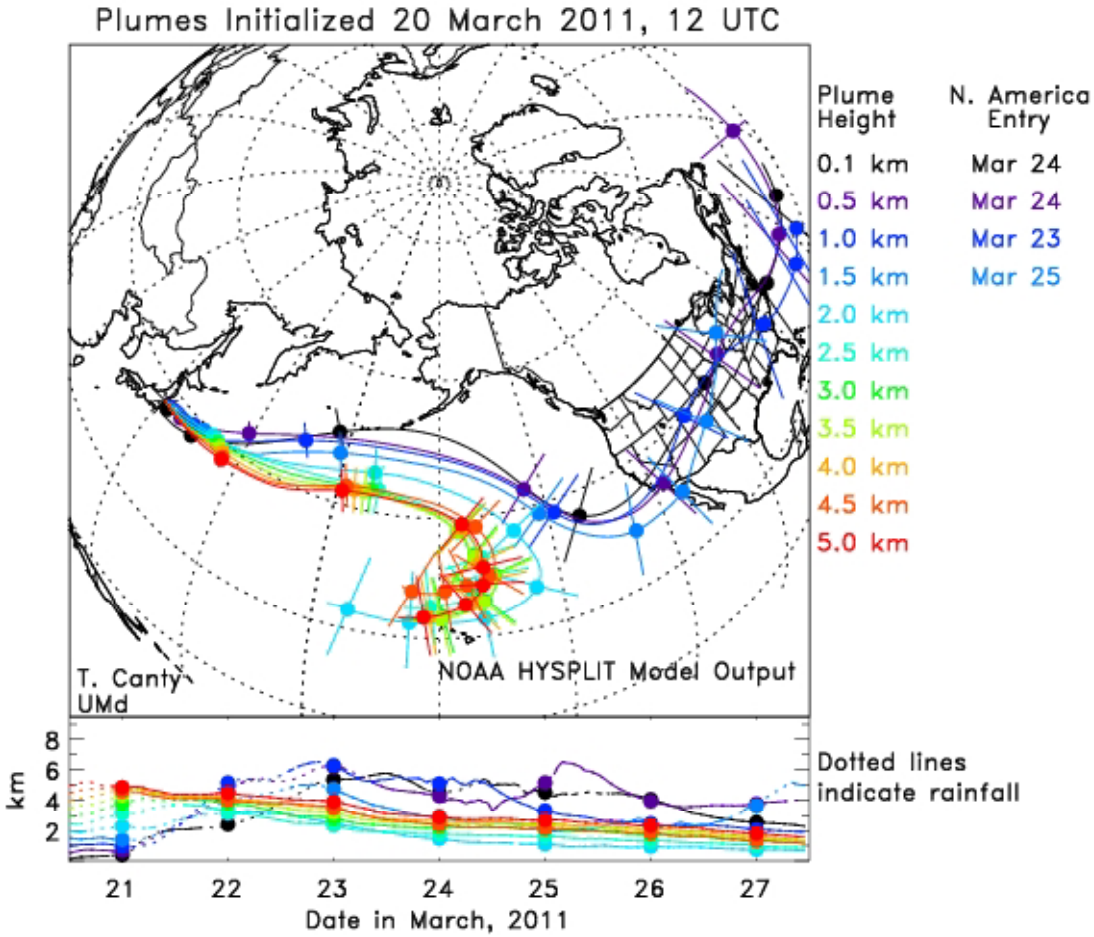
Trajectories updated daily

We have been monitoring the forecast trajectories since early last week.

For more information please see our press release on the Univ. of Maryland homepage:

http://newsdesk.umd.edu/bigissues/release.cfm?ArticleID=2375

Forecast Monitoring



http://www.atmos.umd.edu/~tcanty/hysplit/

Trajectories updated daily

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tories since early last week.

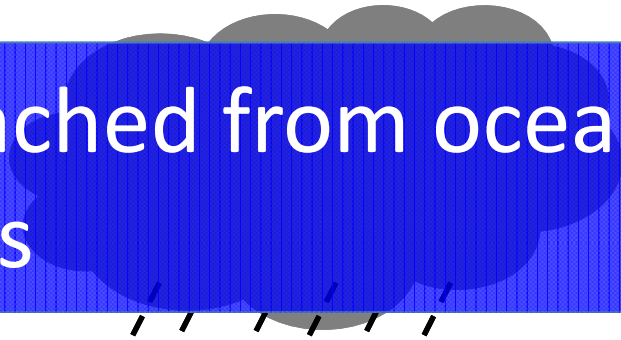
nore information please see our
release on the Univ. of Maryland
page:

edu/bigissues/release.cfm?ArticleID=2375

Atmospheric Structure

Higher up: winds much faster, no clouds → rapid movement with little removal

Clouds: wet, some rain, detached from ocean, faster winds



Marine environment: sea salt, wave action, ocean right there, slowest winds

Conclusions

- Great distance ensures dilution
- Stormy North Pacific will remove some pollution before it ever gets here
- Radioactive decay will eliminate some more