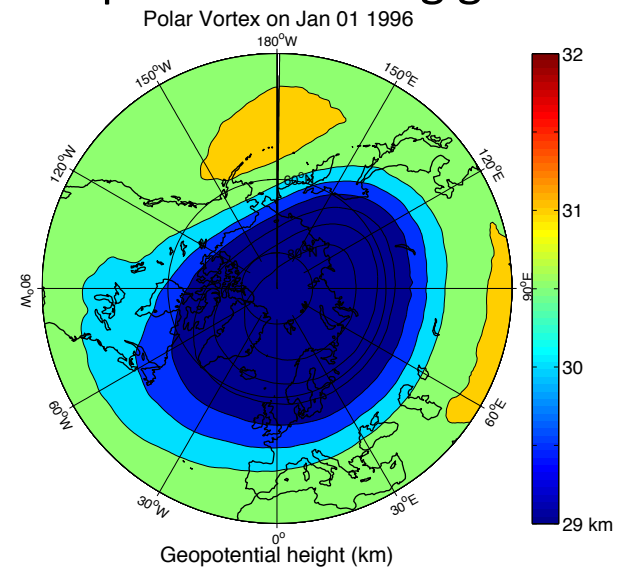


Dynamically motivating the definition
of sudden stratospheric warmings



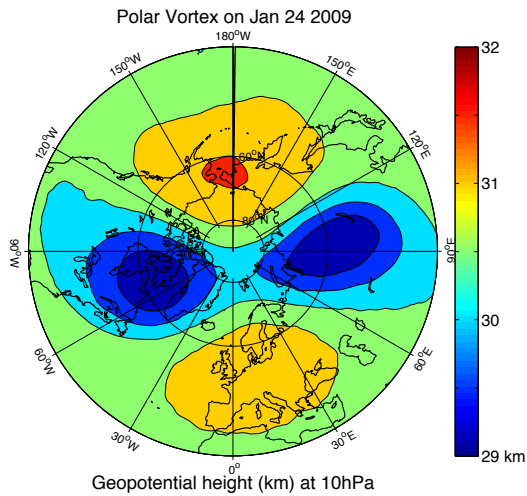
Aaron Match
Mentor Thomas Birner
CMMAP 2013

The polar vortex is gigantic

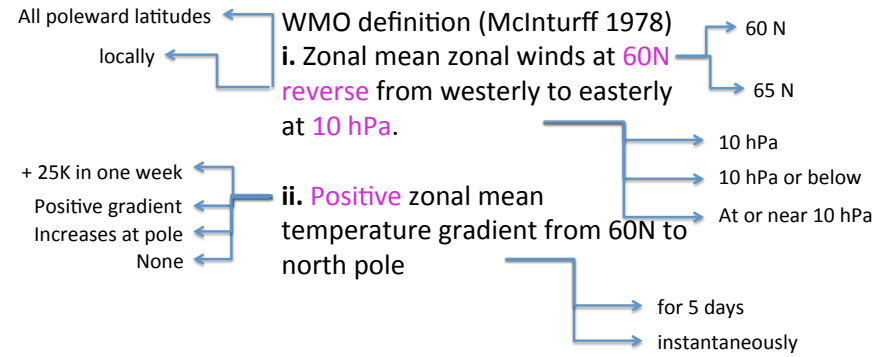


The polar vortex is dynamic

Sudden stratospheric warmings (SSWs) are gigantic

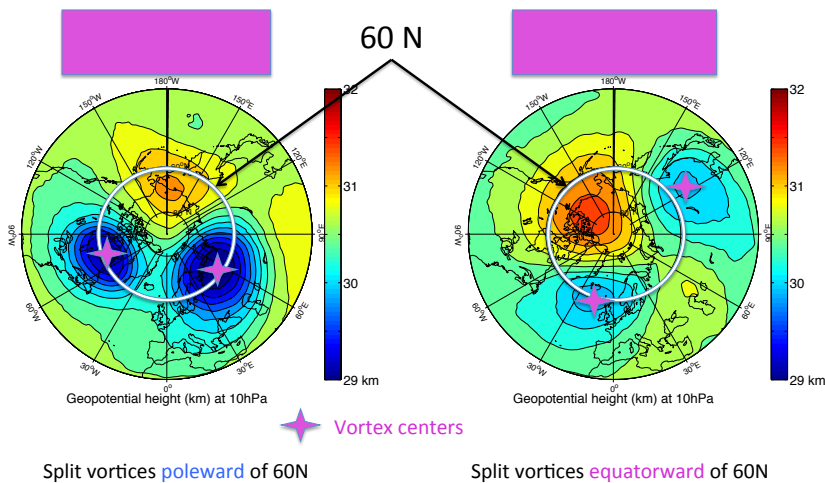


Sudden Stratospheric Warming definitions vary



Major: i. and ii.
Minor: only ii.

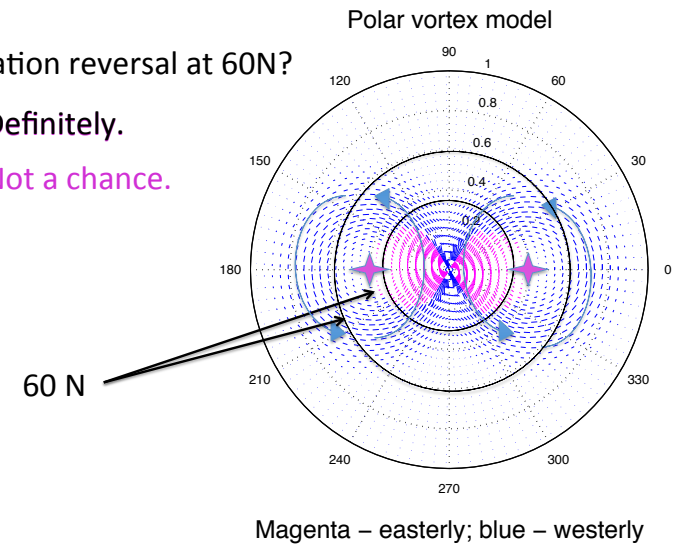
What's the difference?



Vortex model

- Circulation reversal at 60N?

Definitely.
Not a chance.



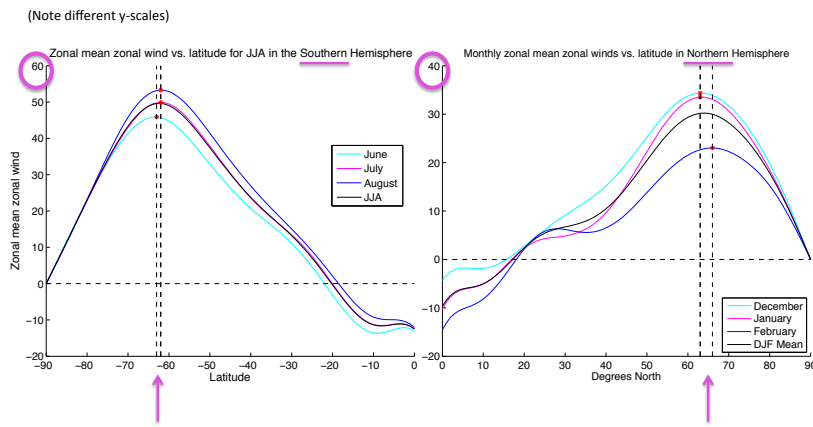
~60N is special because...

- a. 60N marks the **edge** of the polar vortex.
- b. 60N is **most affected** by SSWs.
- c. 60N marks the **transition** from the coherent vortex zone to the 'surf zone.'

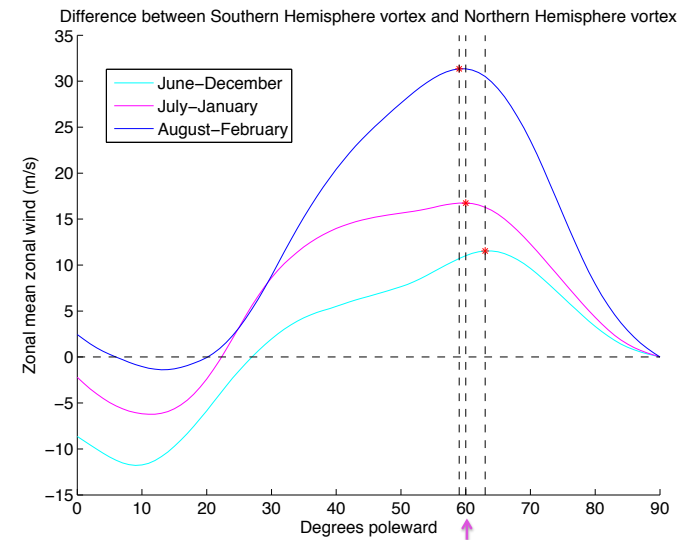
Circulation reversals depend on **geometry**.

So what's so special about **60N**?

a. 60N marks the **edge** of the polar vortex.

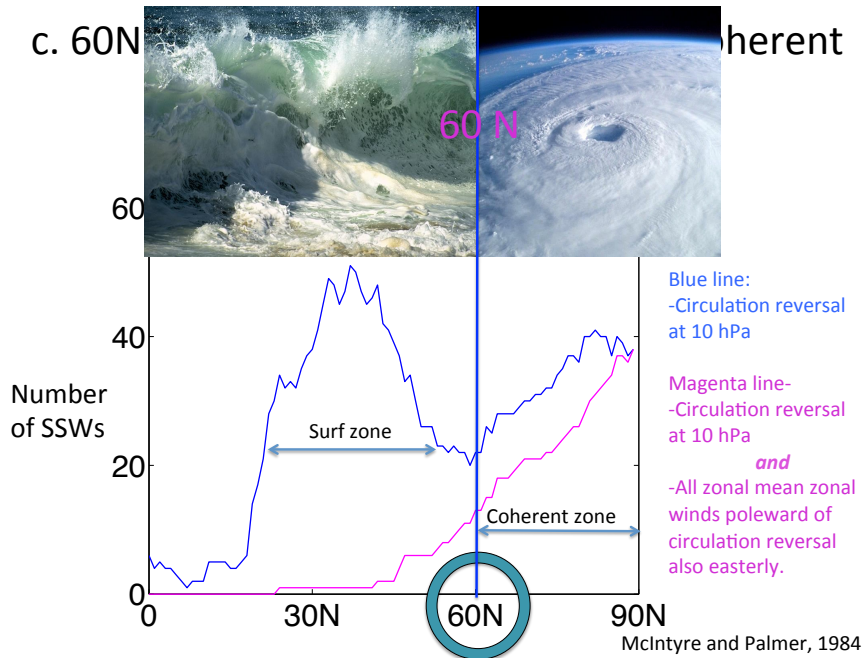


b. 60N is **most affected** by SSWs.



Conclusions

- Major SSWs occur when the vortex center(s) move **equatorward** of the latitude threshold.
- 60 N belongs in the WMO definition because:
 - a. 60N marks the **edge** of the polar vortex.
 - b. 60N is **most affected** by SSWs.
 - c. 60N marks the **transition** from the coherent vortex zone to the 'surf zone.'



Citations and Acknowledgements

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Title photo: Welander, Pierre. "Studies on the General Development of Motion in a Two-Dimensional, Ideal Fluid." *Svenska Geofysika Föreningen*, 7 (1955): 148.

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