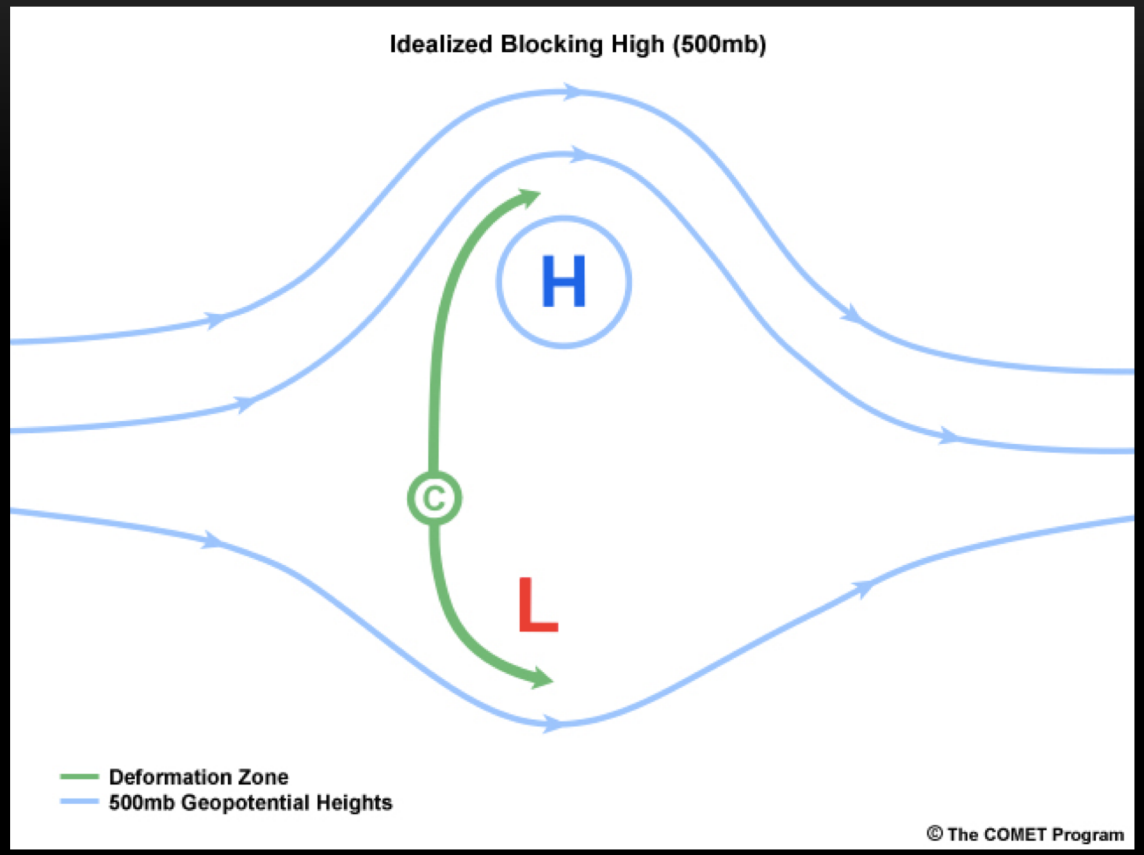
Different Types of Blocking and Their Impacts

- Cut-off High
- Cut-off low
- Rex Block
- Omega Block

Cut-off High



Identification

- Characterized by an upper-level cut-off high
- The westerly upper-level flow abruptly splits into a poleward and equatorward portion, creating the primary deformation zone in the block.

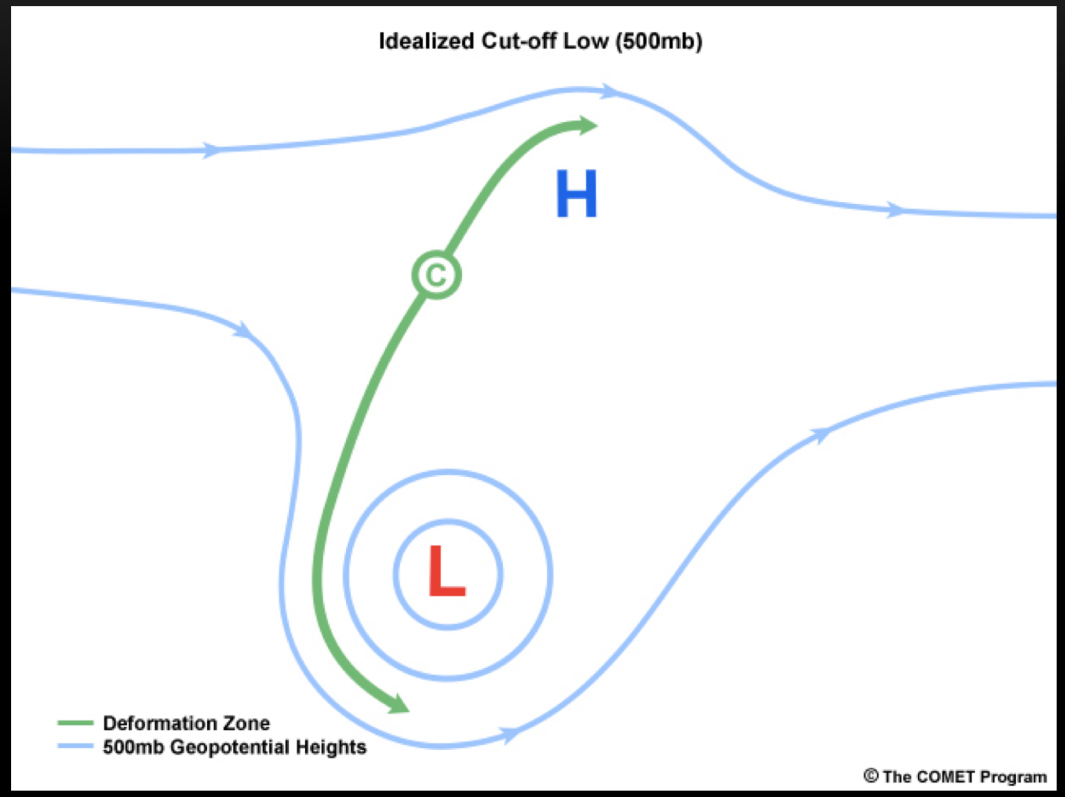
Associated Weather

Significant warm air advection occurs on the west and poleward sides

Extreme drought conditions often develop at the surface underneath the ridge for long lasting blocks.

Wildfire conditions may develop because of the warm and extremely dry conditions.

Cut-off Low



Identification

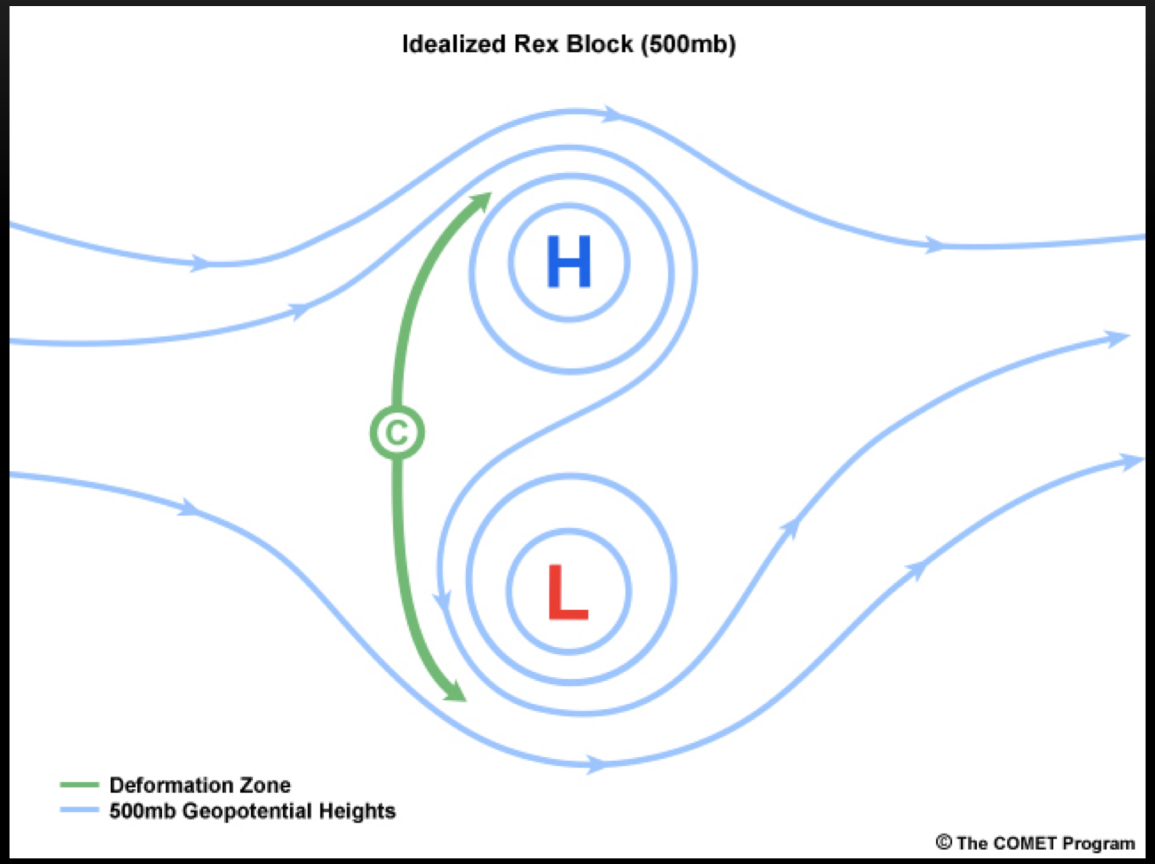
- Characterized by an upper-level cut-off low
- The westerly upper-level inflow abruptly splits into a poleward and equatorward portion, creating the primary deformation zone in the block.

Associated Weather

Significant cold air advection occurs on the west and equatorward side.

Flooding conditions often develop beneath the trough for long-lasting cut-off lows, especially along the eastern portions of the trough.

Rex Block



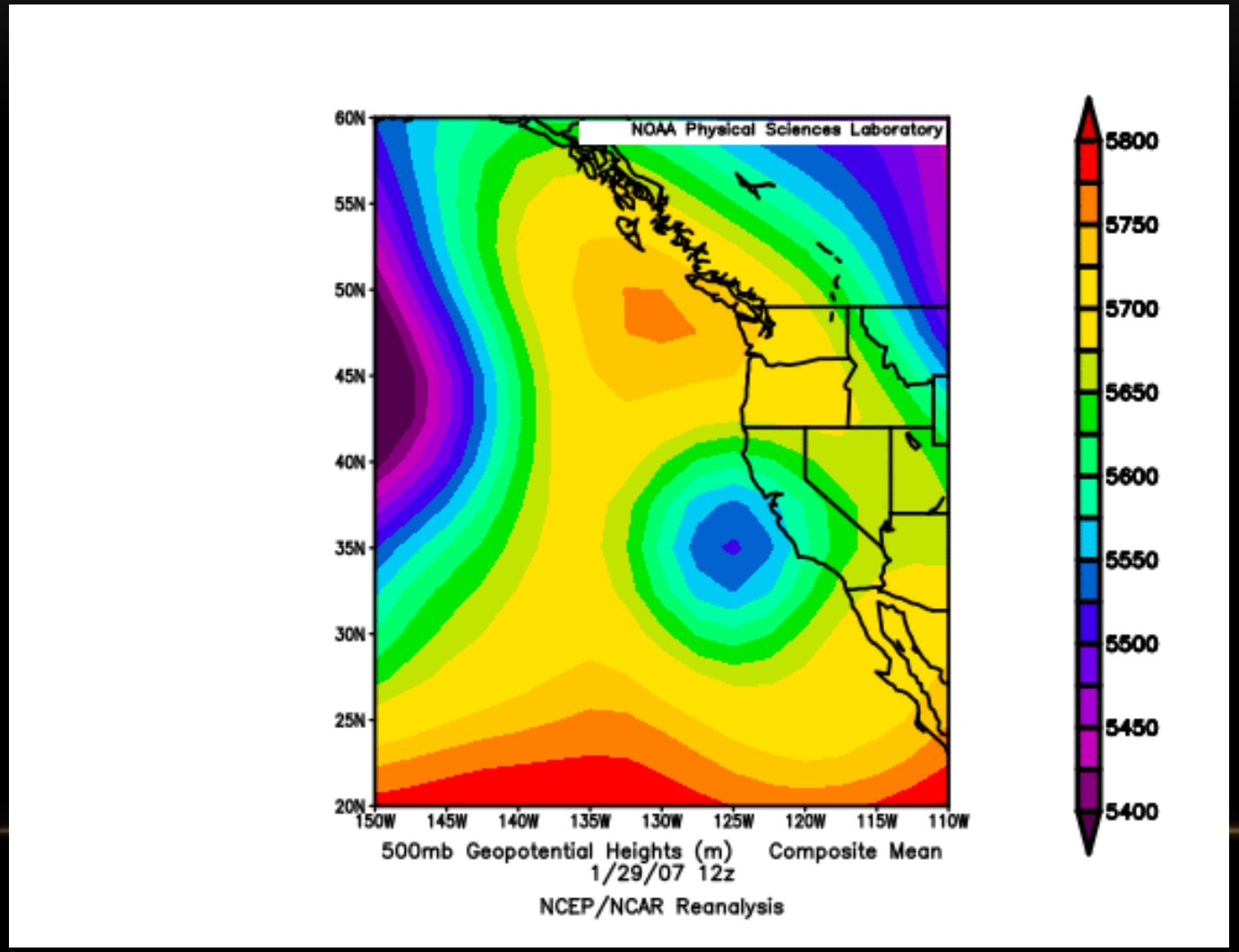
Identification

- a combination of high and low.
- the split of the jet
- remains nearly stationary until one of the height centers changes intensity, or until the meridional deformation zone dissipates.

Associated Weather

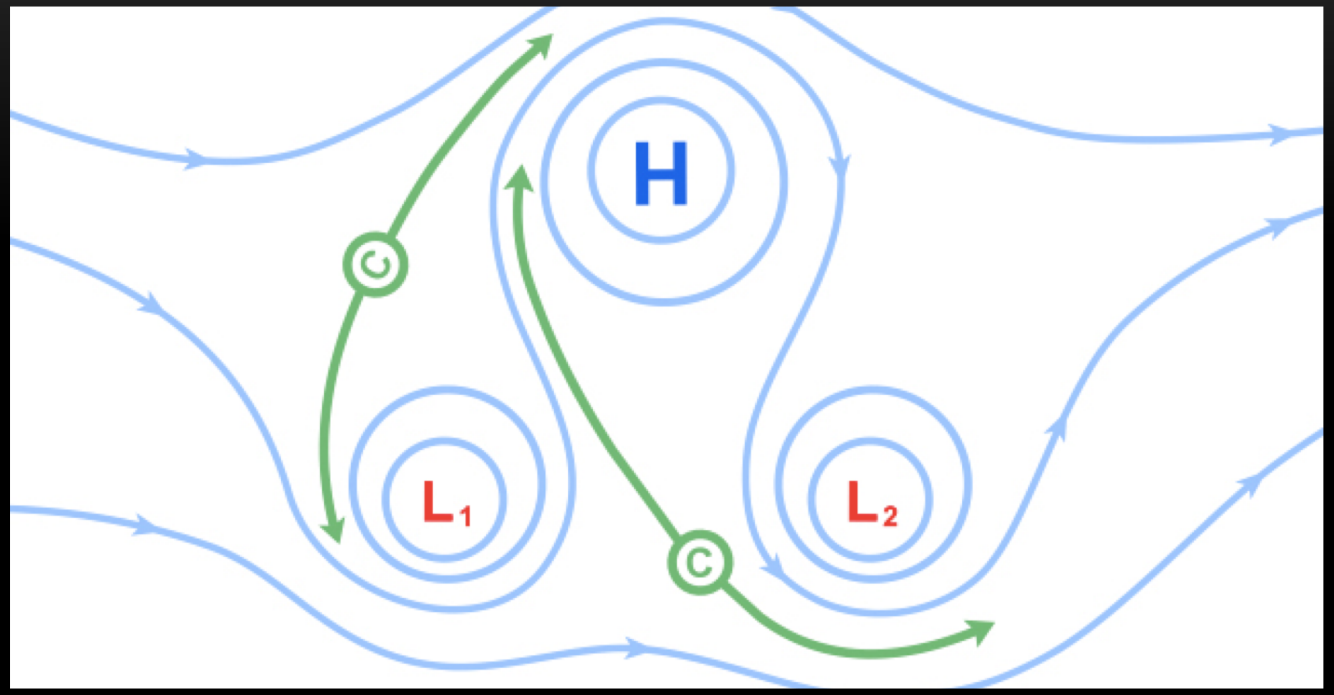
- Conditions under each height center are typical of that height center.
- The abnormality of the Rex Block is the strong easterly winds between the high and low. This easterly flow when centered over the mountains of the West Coast of the United States often produces strong down slope winds and can increase the chance for wildfires.

Rex Block: a real-atmosphere example



https://psl.noaa.gov/data/composites/hour/

Omega Block

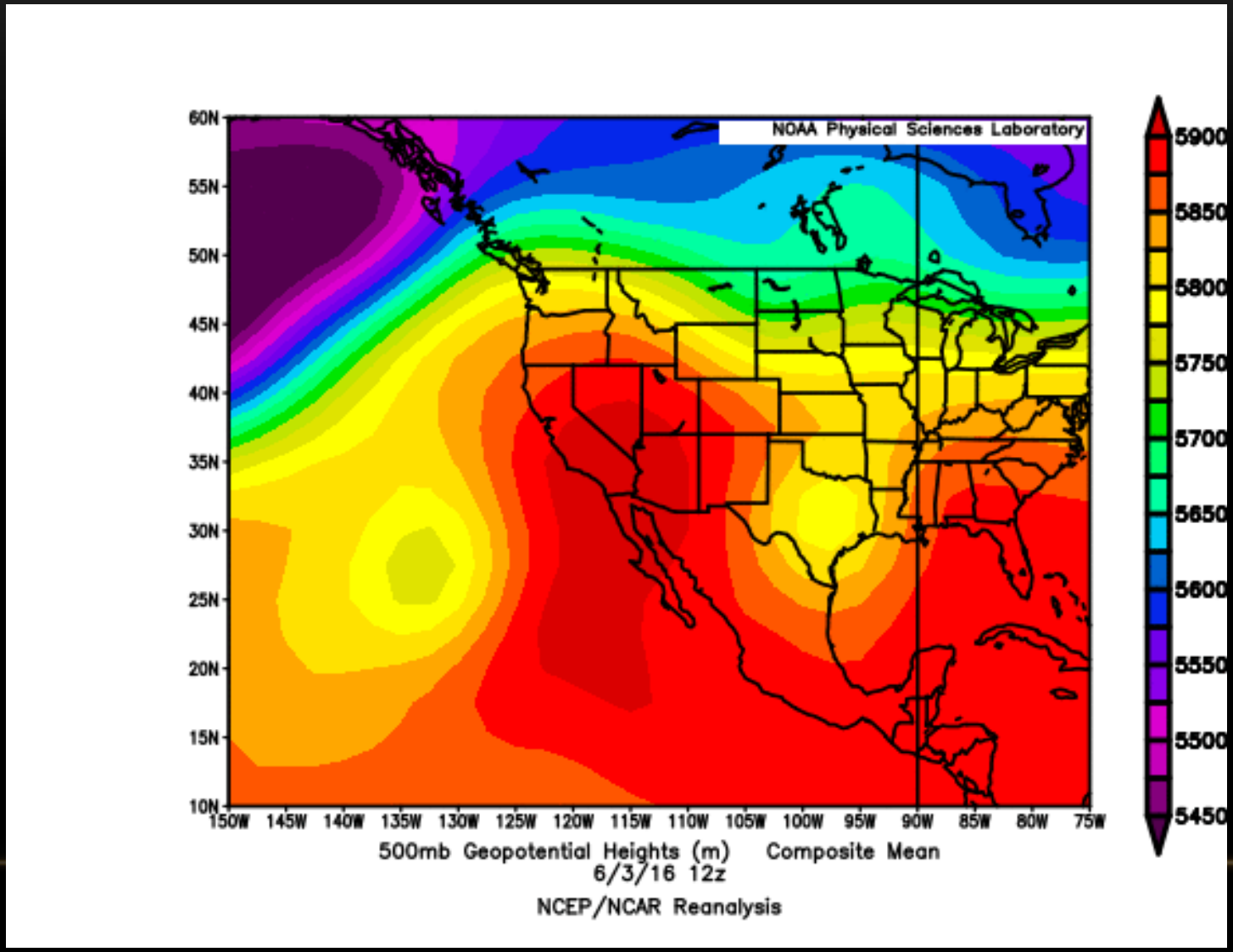


Identification:
a combination of two cut-off lows and one blocking high that form the Greek letter omega (Ω).
The westerly upper-level inflow abruptly splits westward and poleward of the first cyclonic circulation (L_1)

Associated Weather Conditions

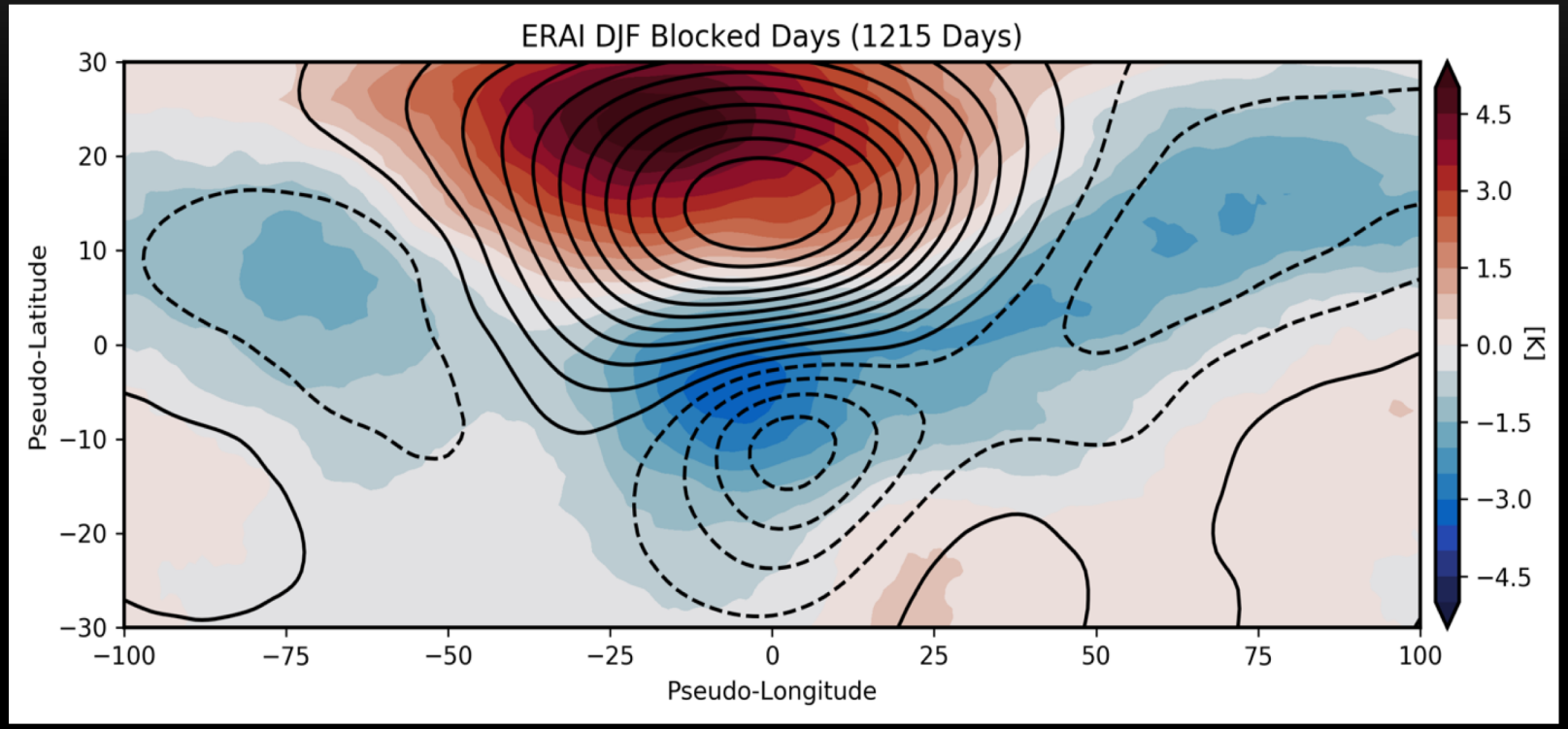
- The western low produces more precipitation along its eastern edge tapping moisture from near the Tropics.
- The eastern low typically is over land, limiting the moisture supply.
- Due to the astounding longevity of some Omega Blocks and their spatial extent, flooding and drought conditions that may occur with this block can be severe.

Omega Block: a real-atmosphere example



https://psl.noaa.gov/data/composites/hour/

Impacts of Blocking on Surface Weather



Composites of 500-hPa geopotential height anomalies (contours) and two-meter temperature anomalies (shading) for blocking during Dec-Feb from 1979-2016. There are strong warm anomalies in the western and poleward side of the blocking high and cold anomalies equatorward and eastern side.

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Summary

- Blocking is an important producer of extreme weather due to its persistence.
- All four types of blocks are characterized by a meridional deformation zone west of the primary circulations, which blocks or deflects the typical eastward propagation of synoptic-scale storms.
- A cut-off high is often associated with warm and dry conditions, which may develop into drought conditions. Blocking highs centered on the eastern, equatorward coast of a continent can produce severe convective events known as the "Ring of Fire".
- A cut-off low is often associated with cool temperatures and precipitation, with possible flooding on the eastern side.
- Combinations of the blocking high and cut-off low weather patterns can be expected under Rex and Omega blocks.

References

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