

Characteristics of 2017/2018 winter monsoon in Japan

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Outline

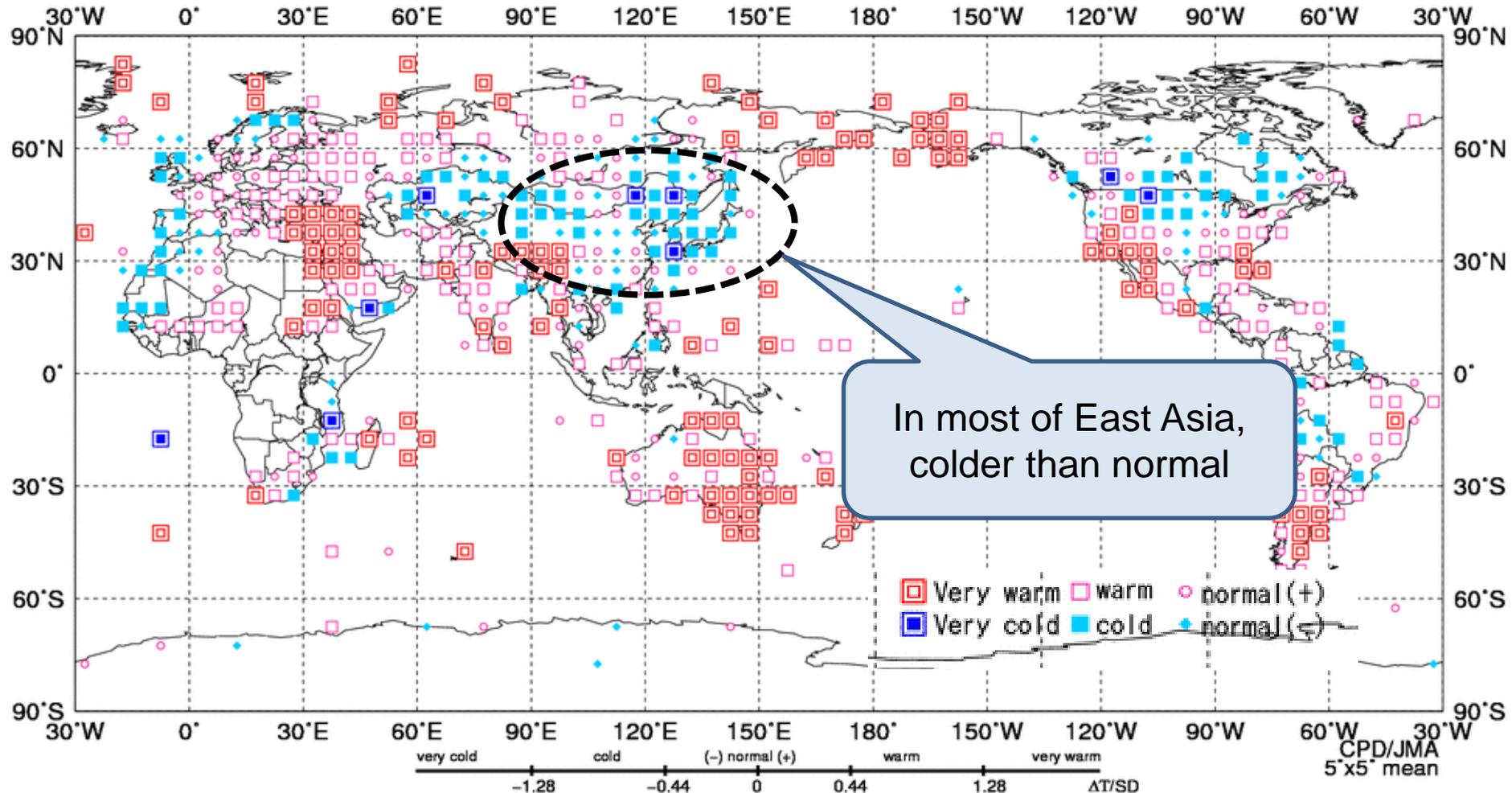
1. Overview of temperature anomalies in 2017/2018 winter
2. Influences of La Niña events
3. Characteristics of circulation in mid and high latitudes

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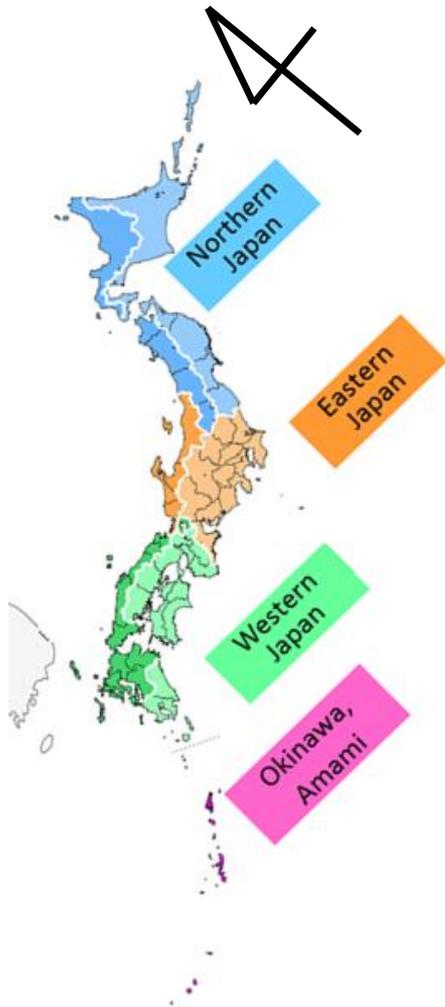
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Overview of Temperature Anomalies in 2017/2018 Winter

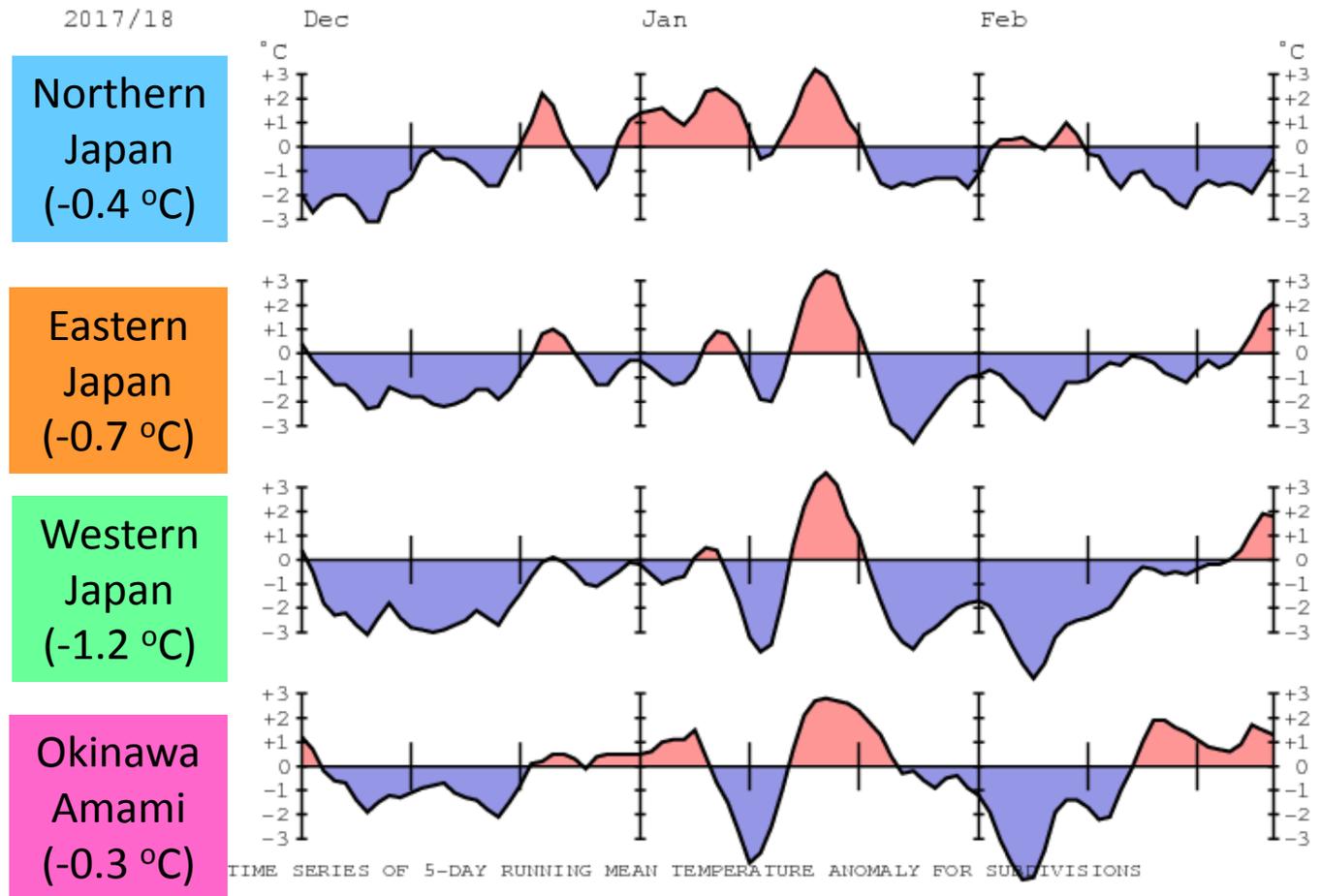
Normalized mean temperature anomalies averaged in $5^\circ \times 5^\circ$ grid boxes for 2017/2018 winter(DJF).



Overview of Temperature Anomalies in 2017/2018 Winter



Time series of 5-day running mean temperature anomaly for subdivisions.



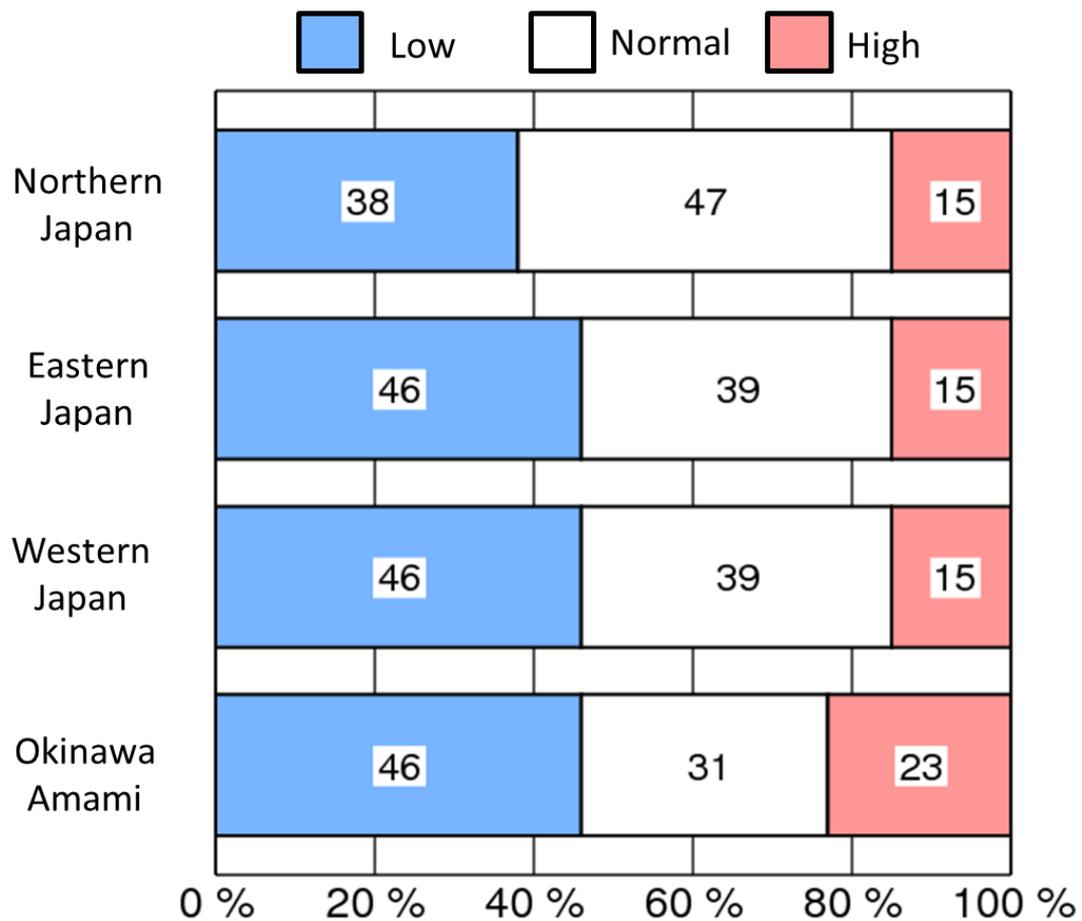
Area averaged temperatures were lower than normal throughout most of the winter 2017/2018.

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Influences of La Niña events

Percentage of mean temperature rank (winter) in La Niña events (1958-2012).
Due to statistical result of area averaged temperature in past.

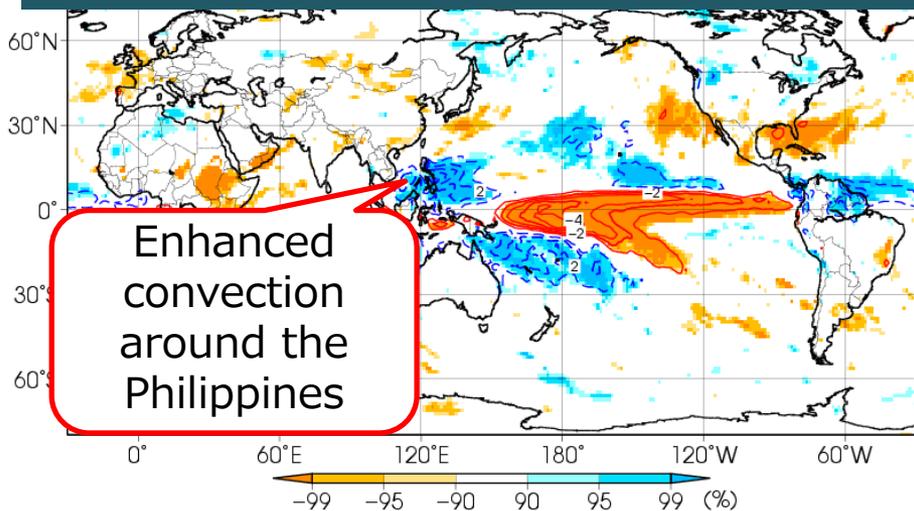


Temperatures tend to be normal or lower than normal in La Niña events.

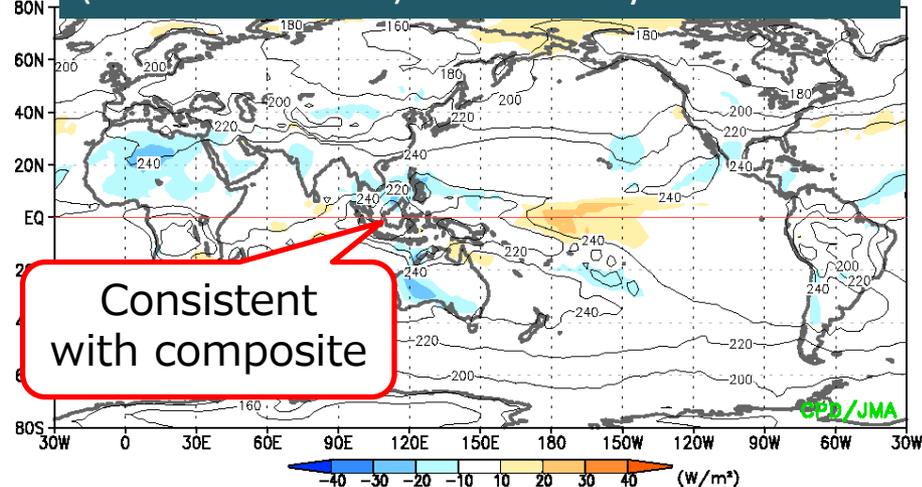
Influences of La Niña events

Composite Analysis in La Niña events

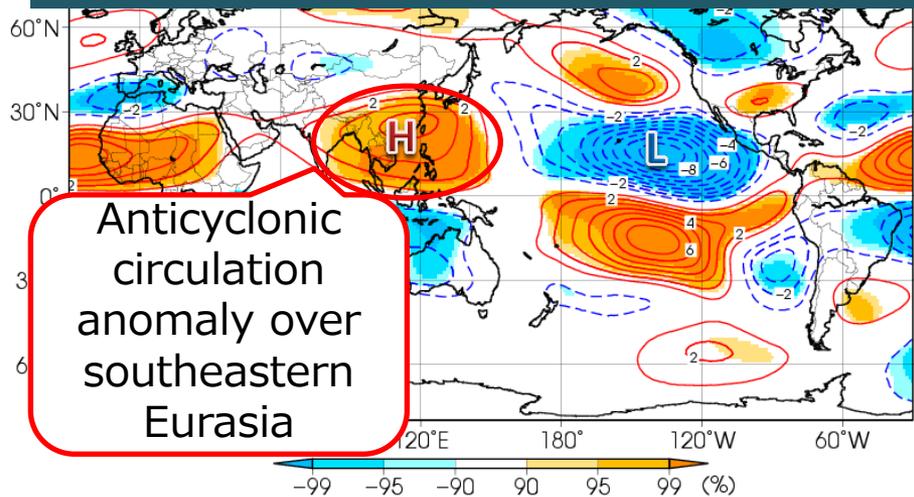
Composite: Precipitation anomaly



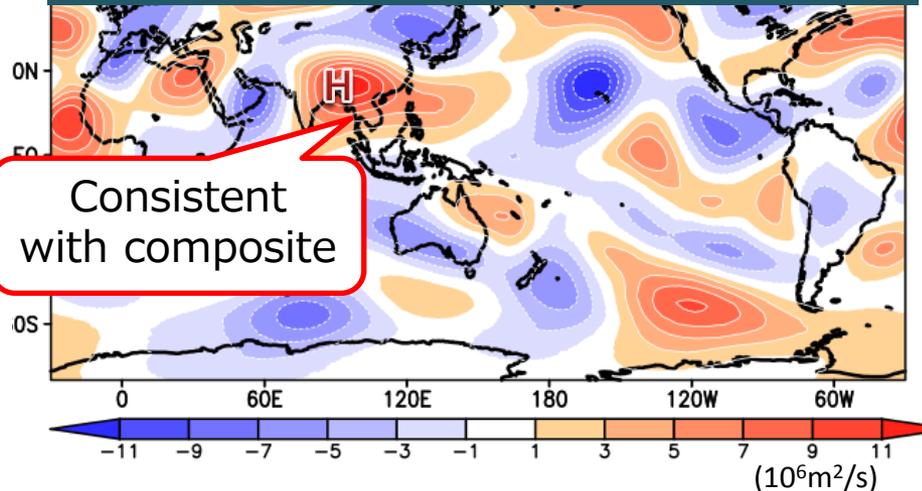
(Last winter mean) OLR anomaly



Composite: 200hPa stream function anomaly



(Last winter mean) 200hPa stream function anomaly



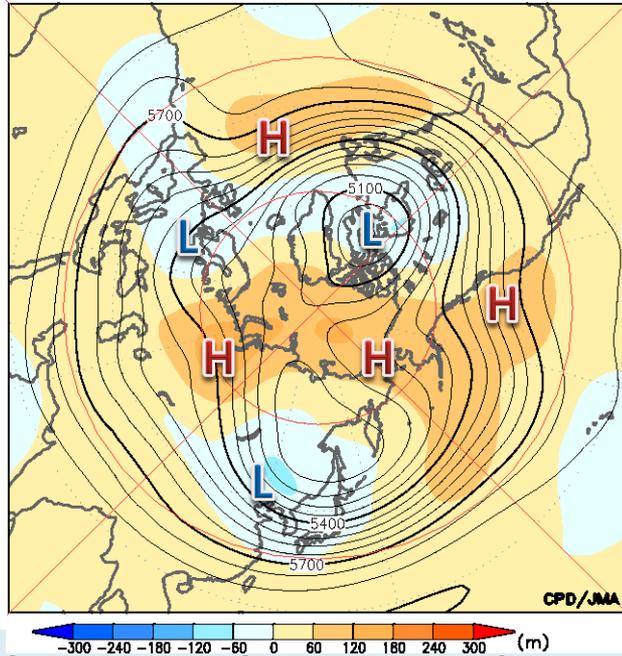
✧ statistical period is 1958-2012 winter

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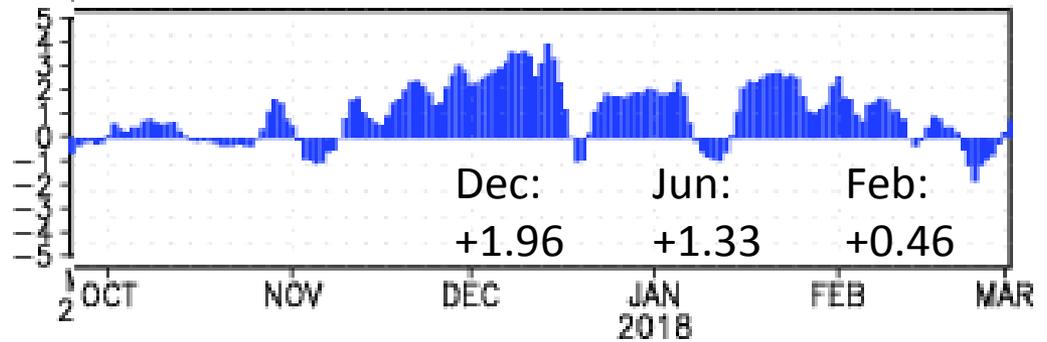
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Characteristics of circulation in mid and high latitudes

500hPa Height anomaly



Eurasian (EU) Index



EU

+1.25

This value is the 4th place since 1958/1959 winter

500hPa Height anomaly

- Positive and negative anomaly patterns were clear from the Atlantic to East Asia.
- Negative anomaly covered East Asia.

Eurasian (EU) Index

- Large and positive Eurasian index was dominant through last winter.

Characteristics of circulation in mid and high latitudes

A blocking high over western Siberia



The polar front jet stream meandered



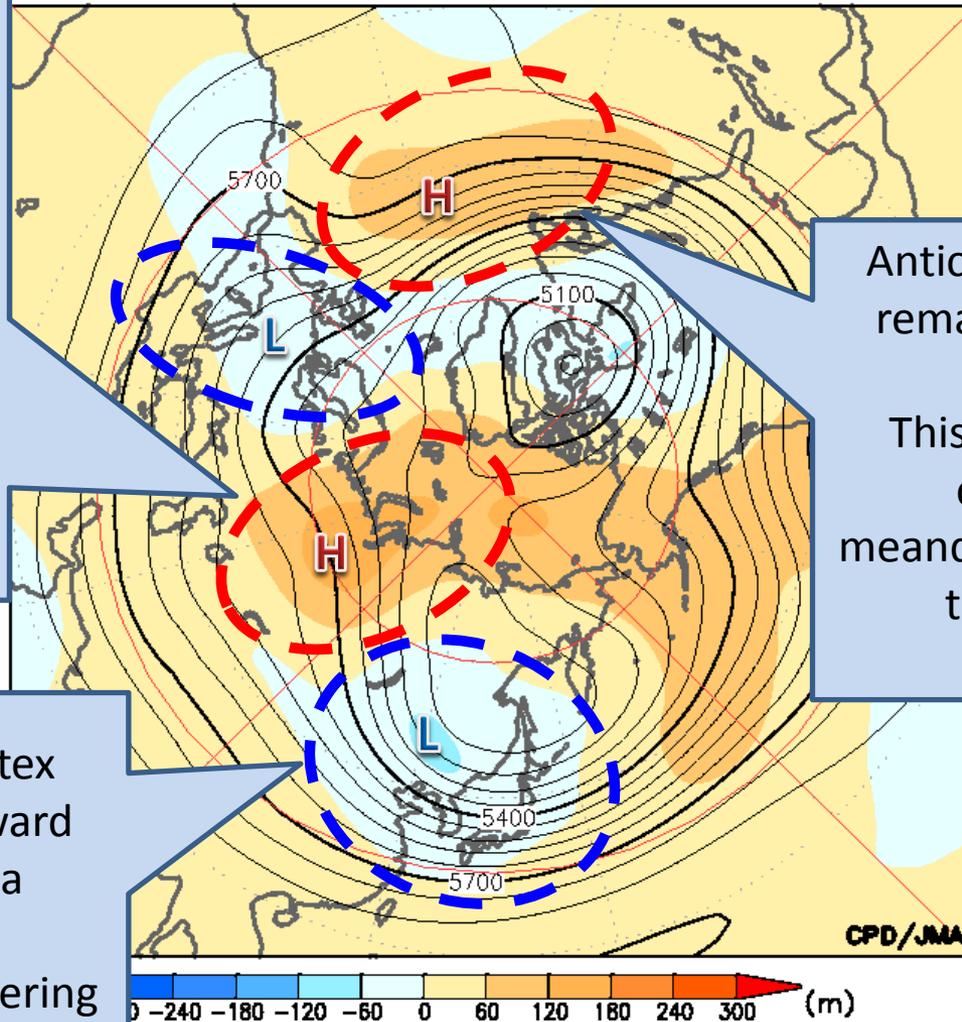
The polar vortex split



One of the Polar vortex pieces shifted southward over eastern Siberia



The southward meandering of the polar front jet stream was enhanced around Japan



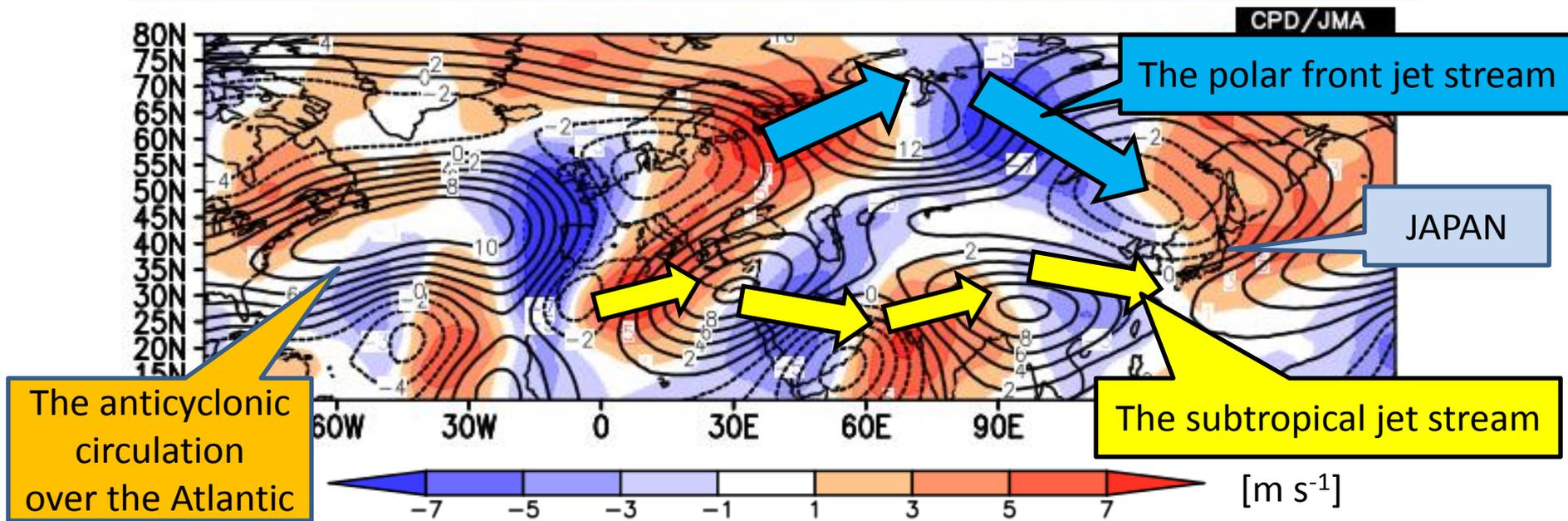
Anticyclonic circulation was remarkable in the Atlantic.



This circulation may have contributed to the meandering of the jet through the teleconnection.

Characteristics of circulation in mid and high latitudes

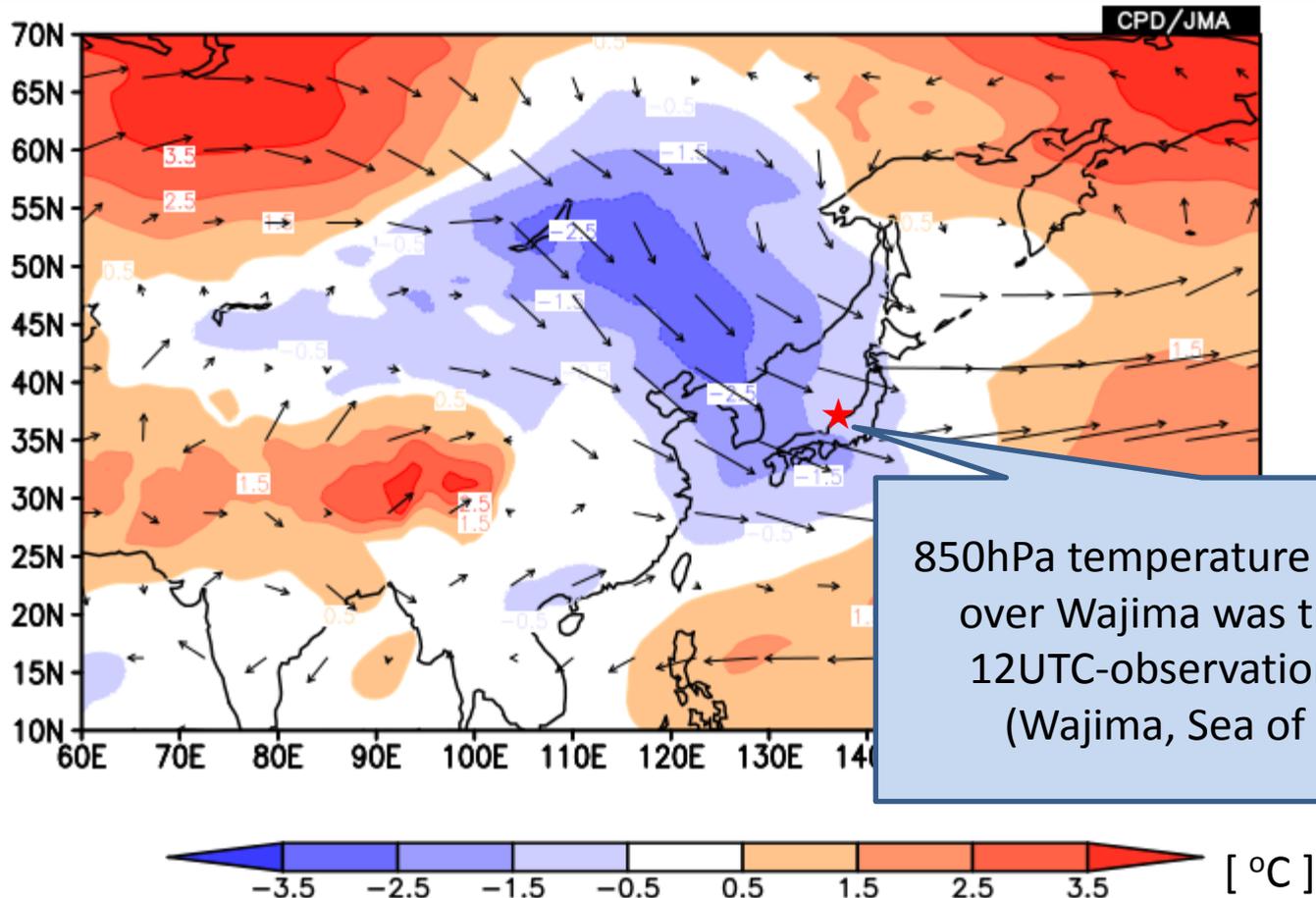
300hPa meridional wind speed (shade) and stream function anomalies (line)
(Dec. 2017 – Feb. 2018)



- The polar front jet stream meandered southward around Japan.
- The subtropical jet stream meandered southward around Japan, too.
- The anticyclonic circulation over the Atlantic may have contributed to the southward meandering of the jets through the teleconnection.

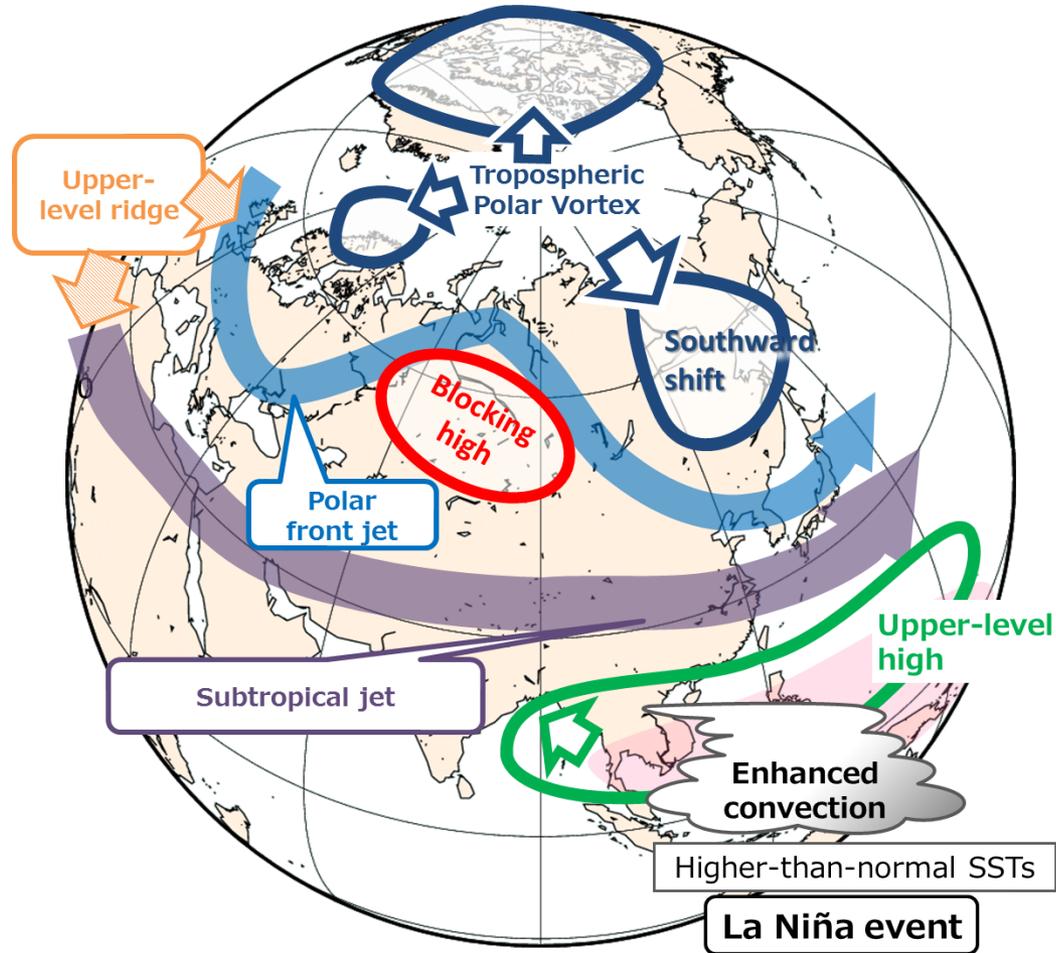
Characteristics of circulation in mid and high latitudes

850hPa temperature anomaly (shade) and wind vector(Dec. 2017 – Feb. 2018)



- Cold surges tended to flow over Japan from Siberia.

Summary



Tendency of southward meandering of the subtropical and polar front jet streams over Japan



Tendency for cold-air-mass flow over Japan