

Scales of Atmospheric Motion

Planetary scale: wavelengths $>\sim 8000$ km.

- Large-scale waves in jet stream.

Synoptic scale: 300 km $\sim <$ wavelengths $>\sim 8000$ km.

- Cyclones & anticyclones; troughs & ridges in jet stream.

Mesoscale: ~ 10 km $<$ wavelengths $>\sim 300$ km.

- Fronts; hurricanes; thunderstorm complexes.

Time-mean Climatological Patterns

500 mb Height

- Troughs east of Asia and North America.
- $|V_g|$ greatest over Pacific and Atlantic oceans.

Mean sea-level pressure

- Aleutian and Icelandic lows.
- Subtropical highs.

Latitude–height vertical profiles

- [Average along latitude circles (East–West).]
- $|\frac{\partial T}{\partial y}|$ greater in January.
- Tropopause-level jet streams.
- Tropopause jet speed (u) & $\frac{\partial u}{\partial z}$ greater in winter.
- Mesospheric jets.
 - Strong seasonality.
 - No effect on weather.