The stationary waves

description

• stationary; zero frequency
• zonal wavenumbers 1-3
• span full range of latitudes; separate equatorial waves
• different in different hemispheres
• seasonally dependent
• winter waves extend into stratosphere
Note strong land-sea contrasts: Low pressure over warm oceans; high pressure over continents and sea ice, an indication of thermally forced features.
Close up of North Atlantic
DJF 500 hPa height   ERA 40
DJF 250 hPa height and wind   ERA 40
DJF stationary waves in eddy geopotential height $Z^*$

60°N

45°N

25°N

DJF 200 hPa height

Z* along 45°N

Observations

Simulation


January 300 hPa Z*

Observations

Simulation
The Stationary Waves
Dynamics

- forced by mountains and land-sea thermal contrasts
  width of mountain range is important
- strongest in high latitude NH, winter
- poleward heat flux, upward EP flux centered ~60°N
- dispersion to lower latitudes at jet level
- interaction with transients not discussed here
- waves interact with polar night jet
- there also exist equatorially-trapped planetary waves