

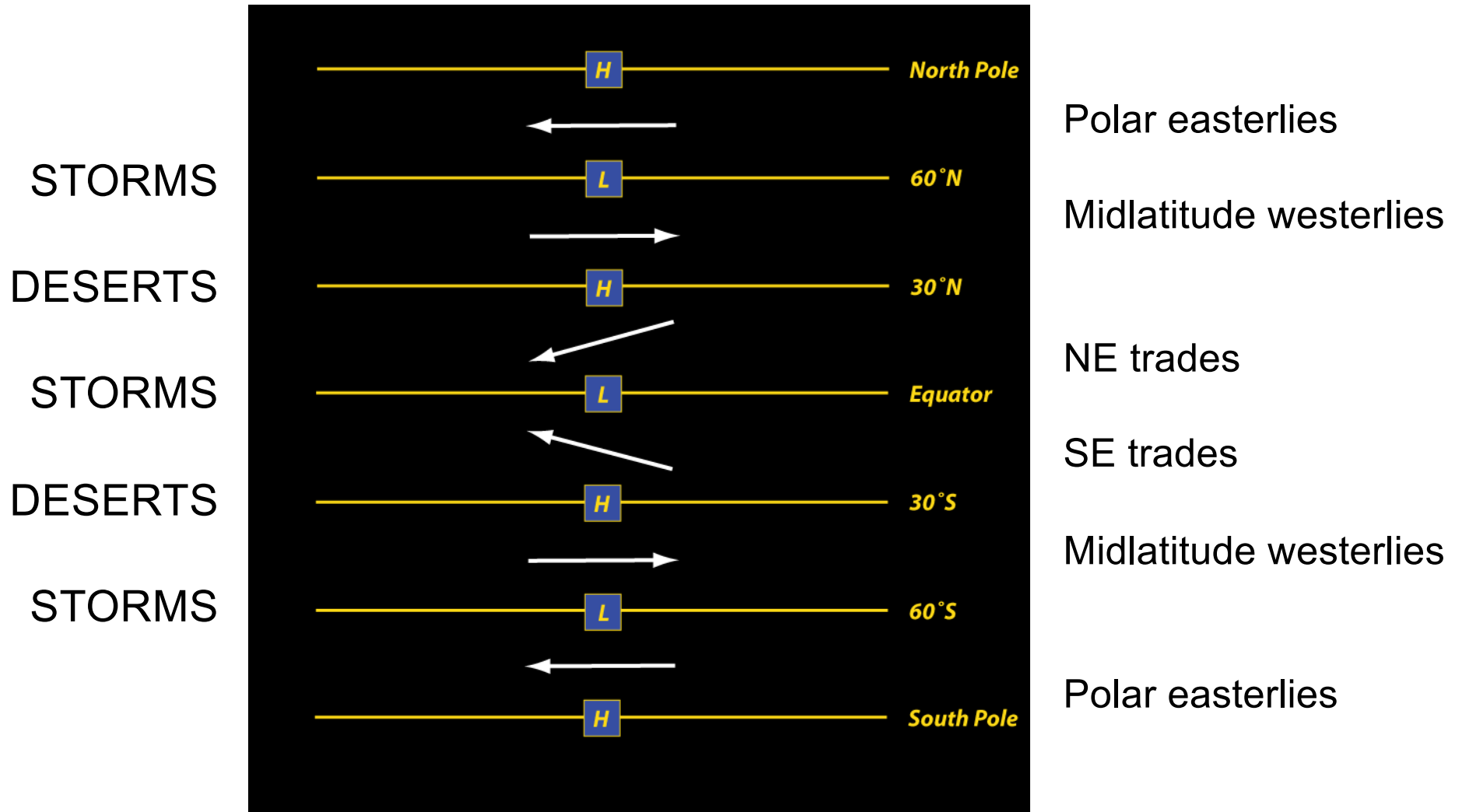
Atmospheric circulation and its consequences

ATM 210 -- Fall 2023 -- Fovell

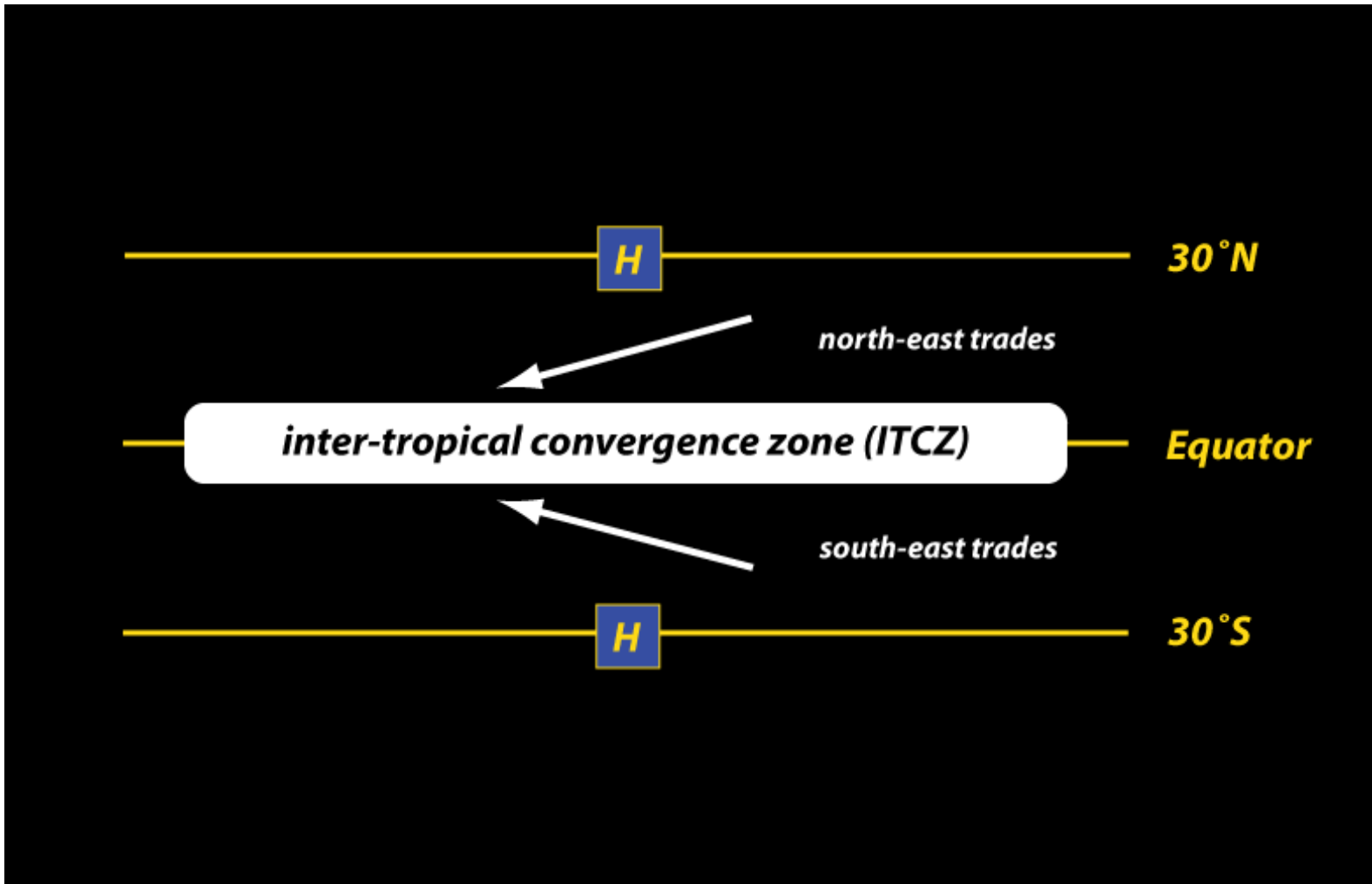
Keep in mind

- Coriolis acts to right following motion in NH, to left in SH
- In geostrophic flow, PGF and Coriolis oppose
- Sea-breeze model showed us
 - Air tends to rise and establish surface L pressure when/where warm
 - Air tends to sink and establish surface H pressure when/where cold
- Rising air can lead to storms
- On the large scale, air circulates CCW around surface L pressure (cyclones) and CW around surface H pressure (anticyclones) in NH; opposite in SH
- Coriolis weaker in tropics, zero at equator

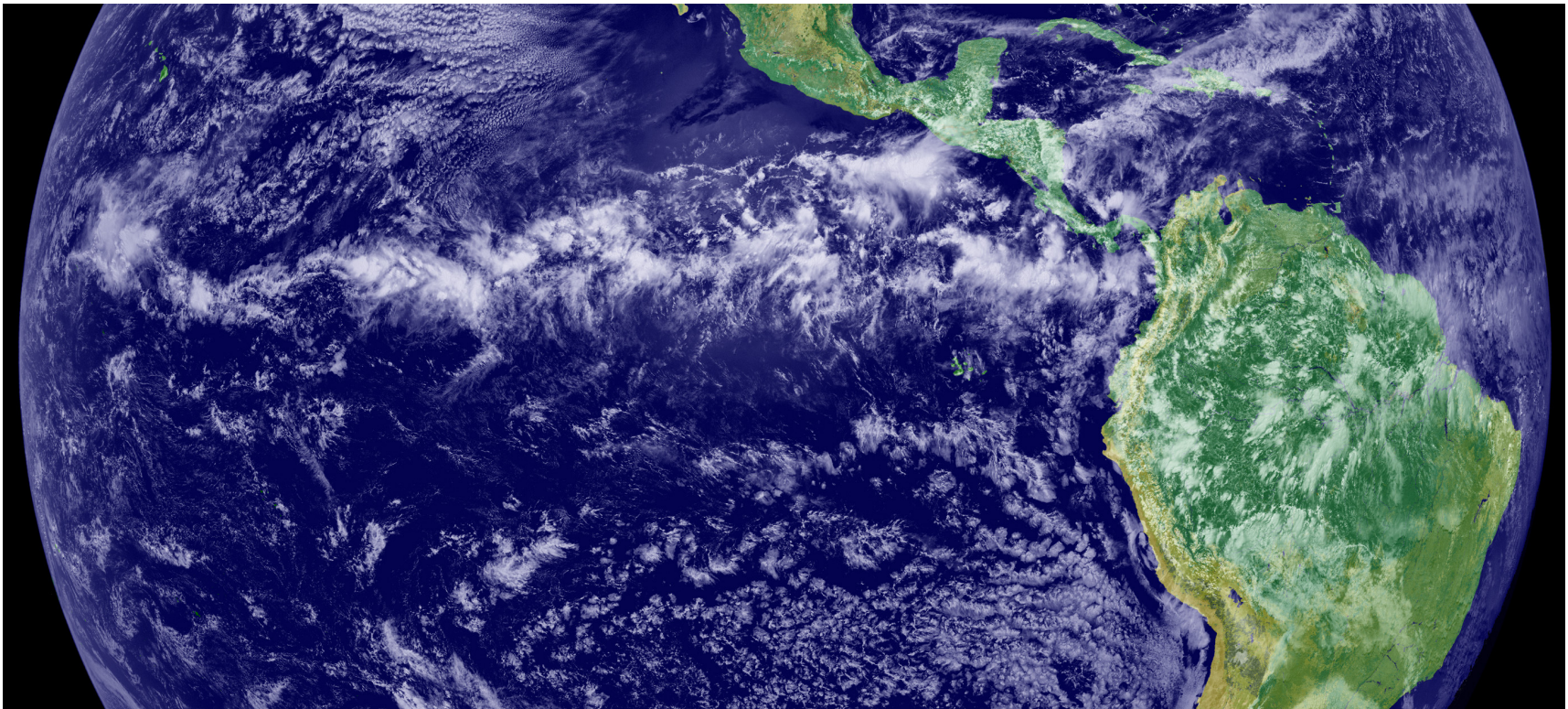
Expected surface winds from 3-cell model



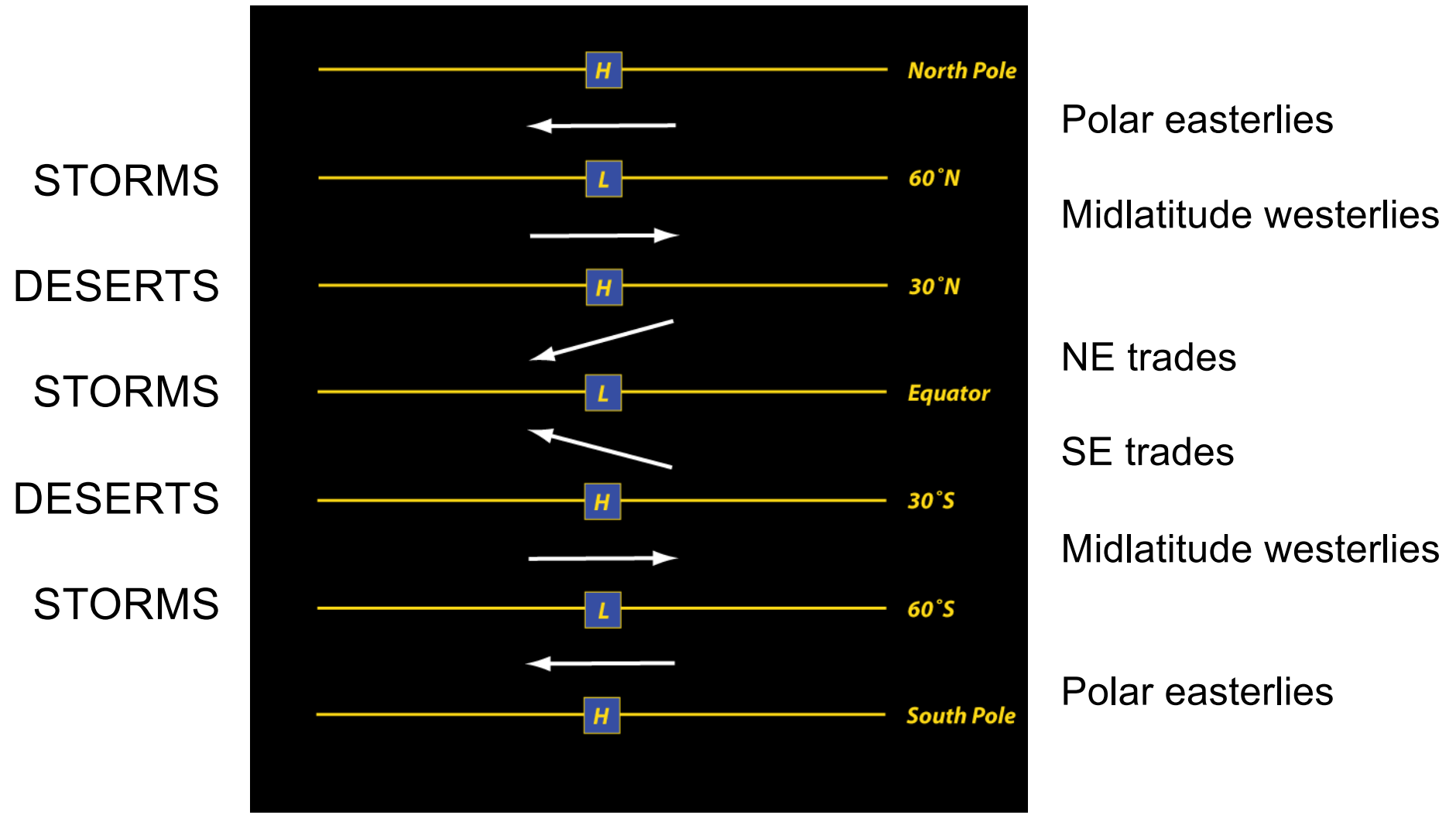
Zoom in on equator



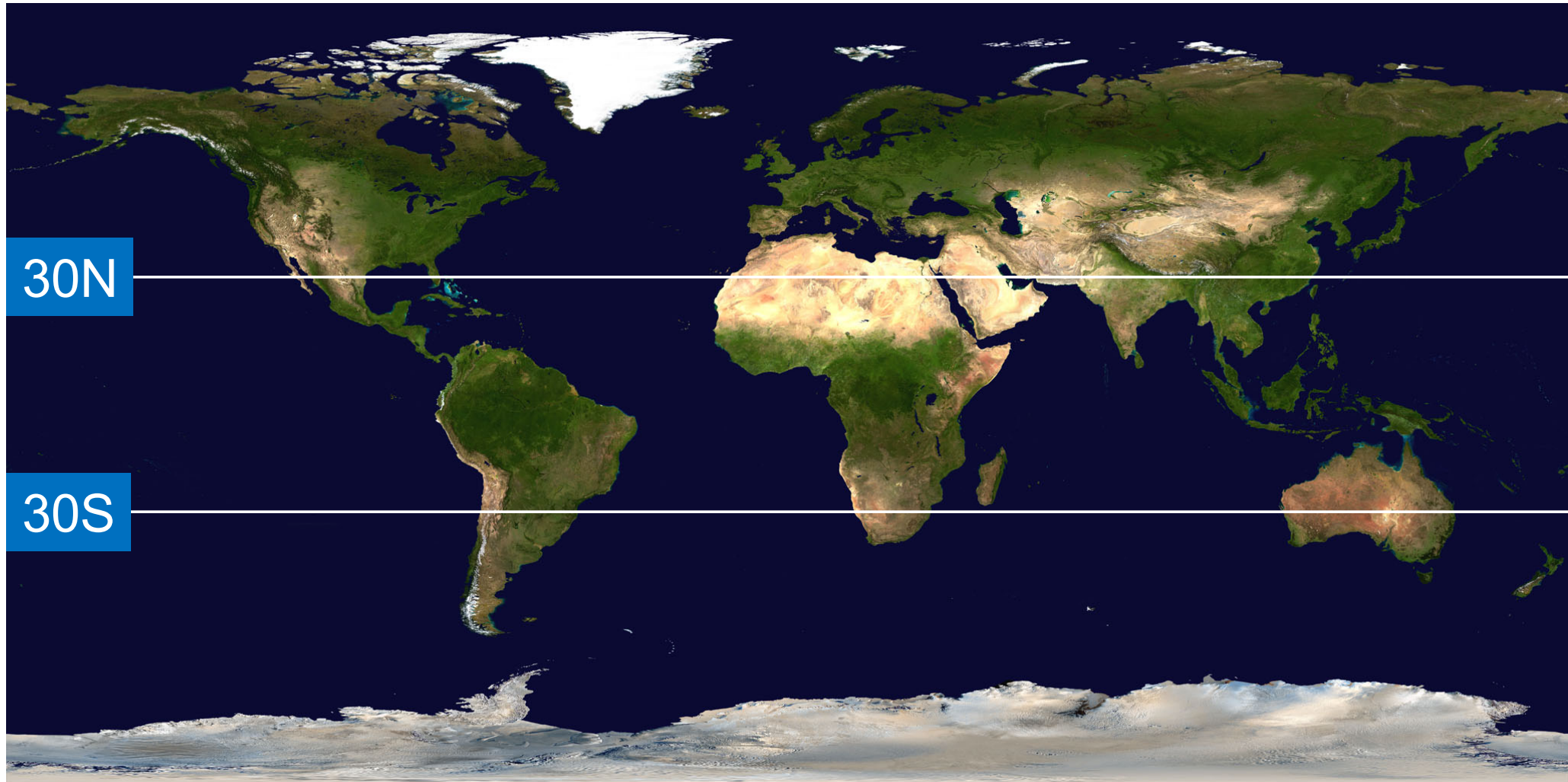
ITCZ seen from space



“In theory, there’s no difference between theory and practice, but in practice there is.”

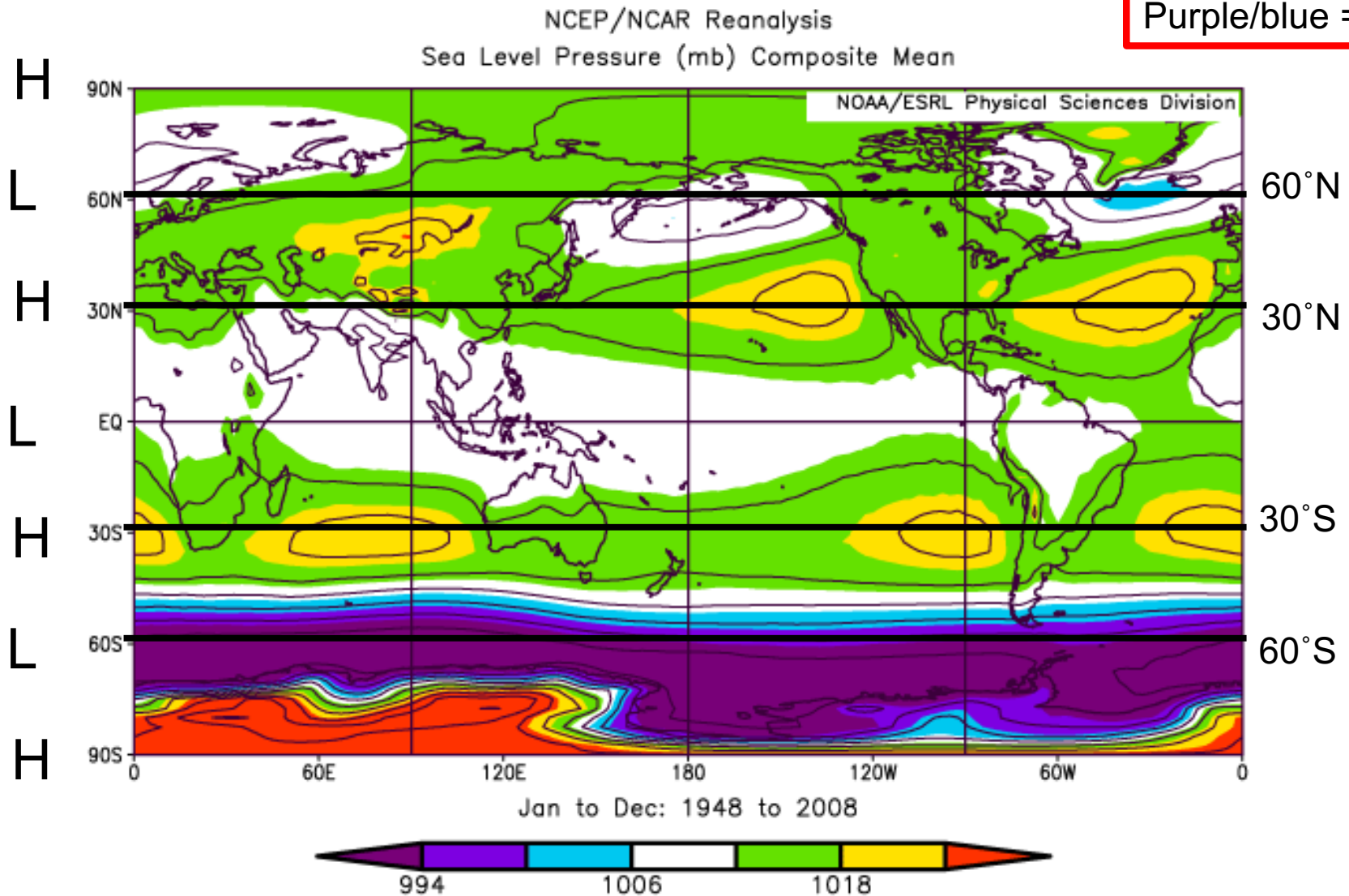


NASA composite satellite picture



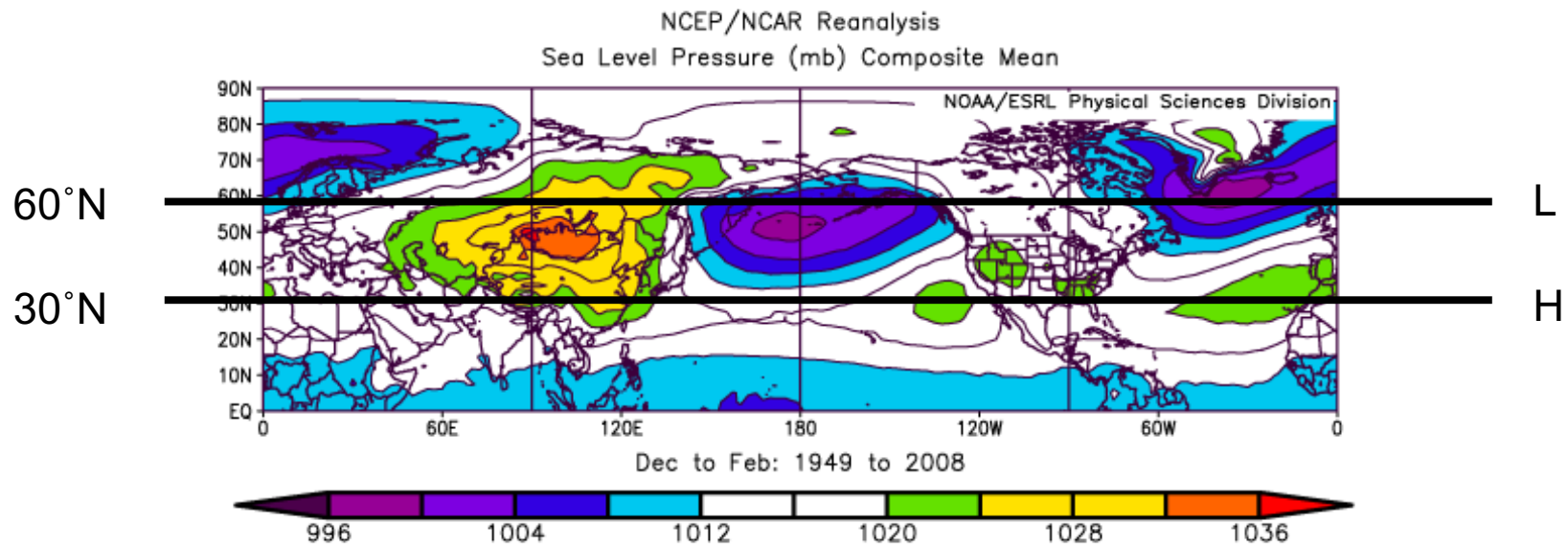
Annual average sea-level pressure (SLP)

Red/yellow = H
Purple/blue = L



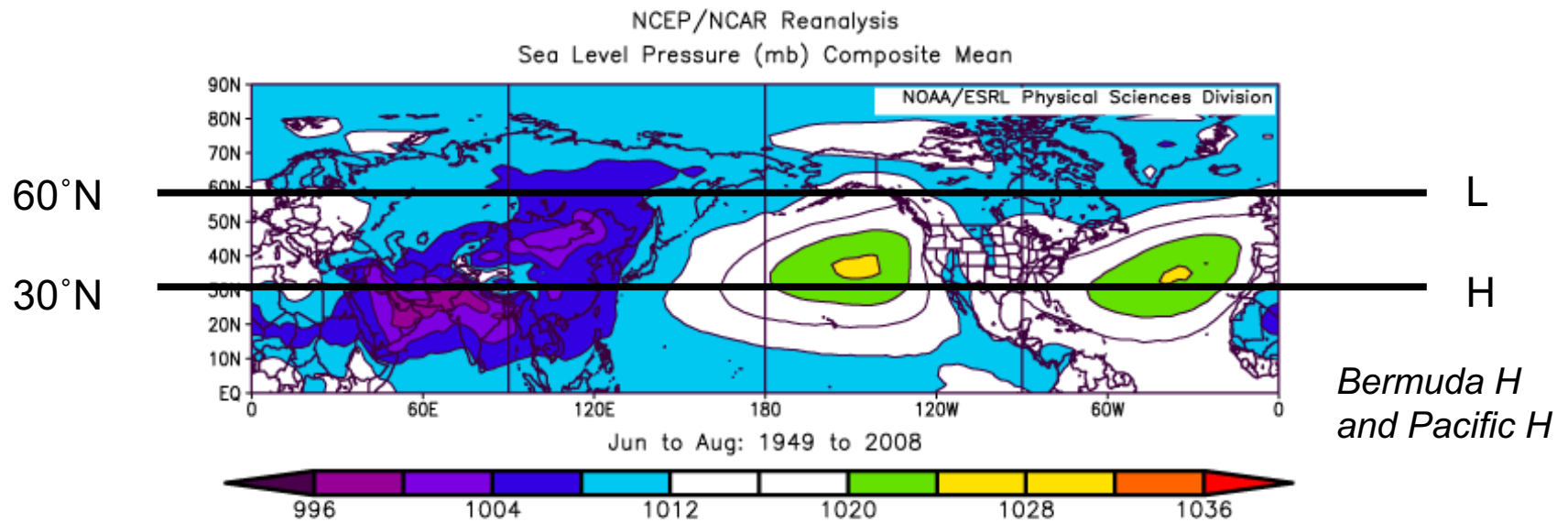
60°S low is prominent owing to more ocean, less land

NH winter average SLP



L at 60°N is prominent, especially over oceans
H at 30°N is weak
Highest pressures are where? Why?

NH summer average SLP

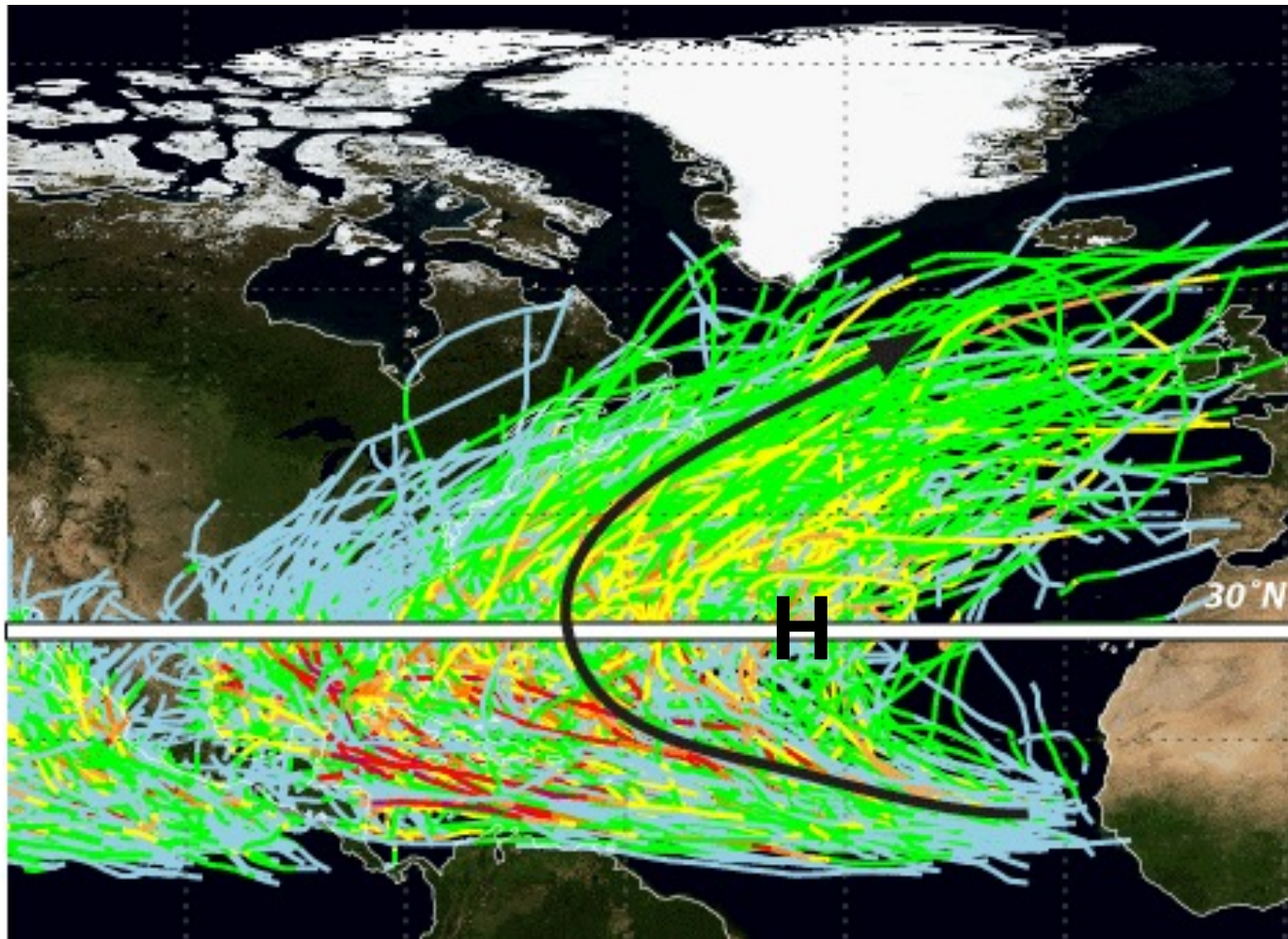


High pressure at 30°N is prominent

Low at 60°N is absent

Where are the lowest SLPs? Why?

North Atlantic hurricane tracks 1947-2007



CW around
Bermuda H

NH hurricanes tend to move westward south of 30°N,
and move eastward north of 30°N

[end]