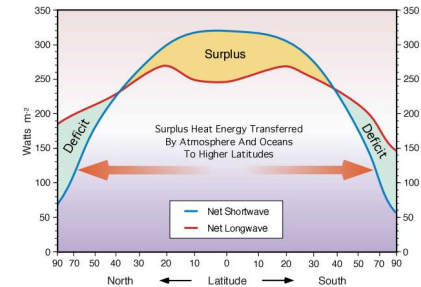


“General Circulation”

- Usually described as the time-averaged flow for a month, season or year
- The gross aspects of the essential General Circulation can be explained by considering a rotating planet the size of Earth and with roughly the same GH gases, without worrying about continents and mountain ranges

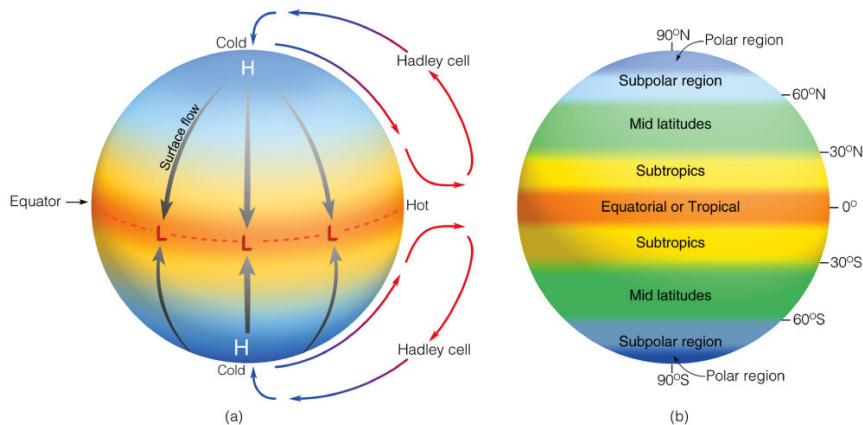
“General Circulation”

- More energy is absorbed in the tropics than is emitted to space.
- Less energy is absorbed in the polar regions than is emitted to space.



- As a result the tropics are warmer than the polar regions *and* the subsequent pressure gradients drive circulation that move the excess heat in the tropics to the poles

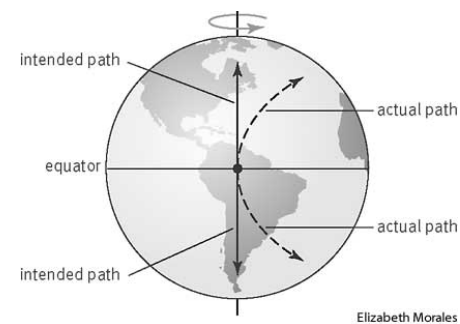
Slowly Rotating Earth



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Like a *large scale sea-breeze* (hot tropics/cold poles)

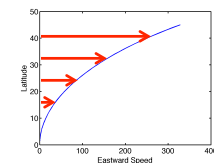
Idealized Model of Realistic Rotating Earth (24hrs)

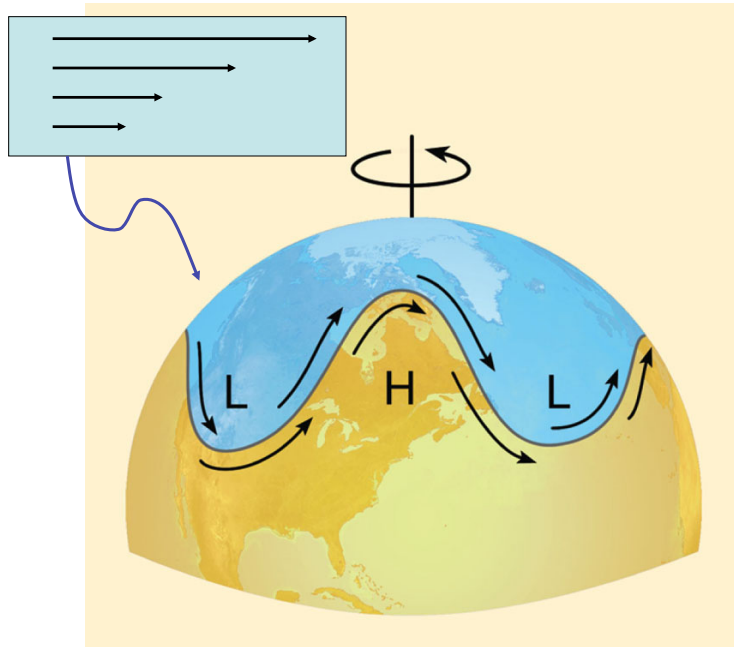


To conserve angular momentum, moving air at rest from the equator to X° N or S would have to be moving eastward at ...

Latitude X	Eastward Speed
Equator	0 m/s (540m/s as seen from space)
20°	58 m/s
45°	375 m/s

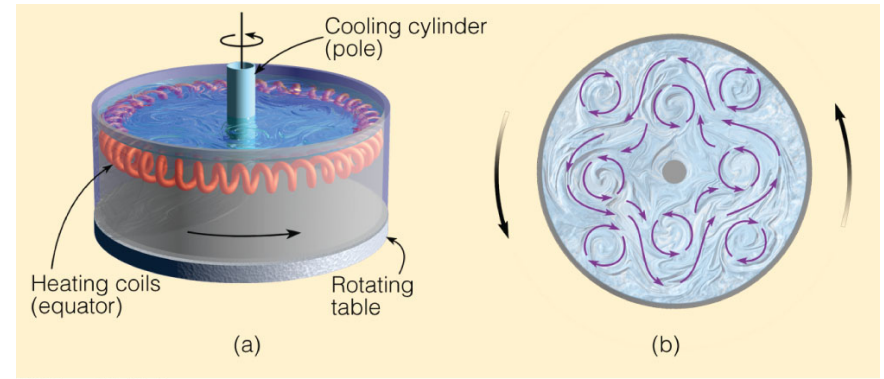
The Equator-to-Pole Cell is broken because conservation of angular momentum creates large shear in the flow, which wobbles and creates storms





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Fig. 3, p. 266



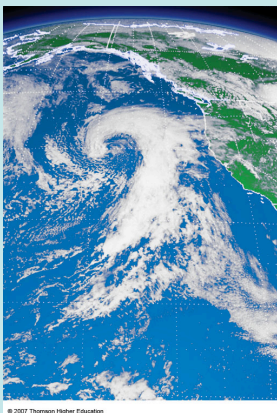
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Watch the Movie

www.youtube.com/watch?v=lmNxEMv85IA

Stable Flow: <http://www.youtube.com/watch?NR=1&feature=endscreen&v=olKFj6g-nPw>

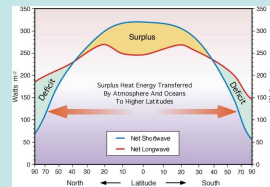
Storms like this one account for about 2/3 of the total heat moved from equator-to-pole by circulation



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Typical mid-latitude cyclone

Hence, equator-to-pole differences in radiation give rise to equator-to-pole temperature differences and hence circulation.



In turn, circulation moves excess energy from the equator to the poles (cooling the tropics and warming the poles)

IR Movie

