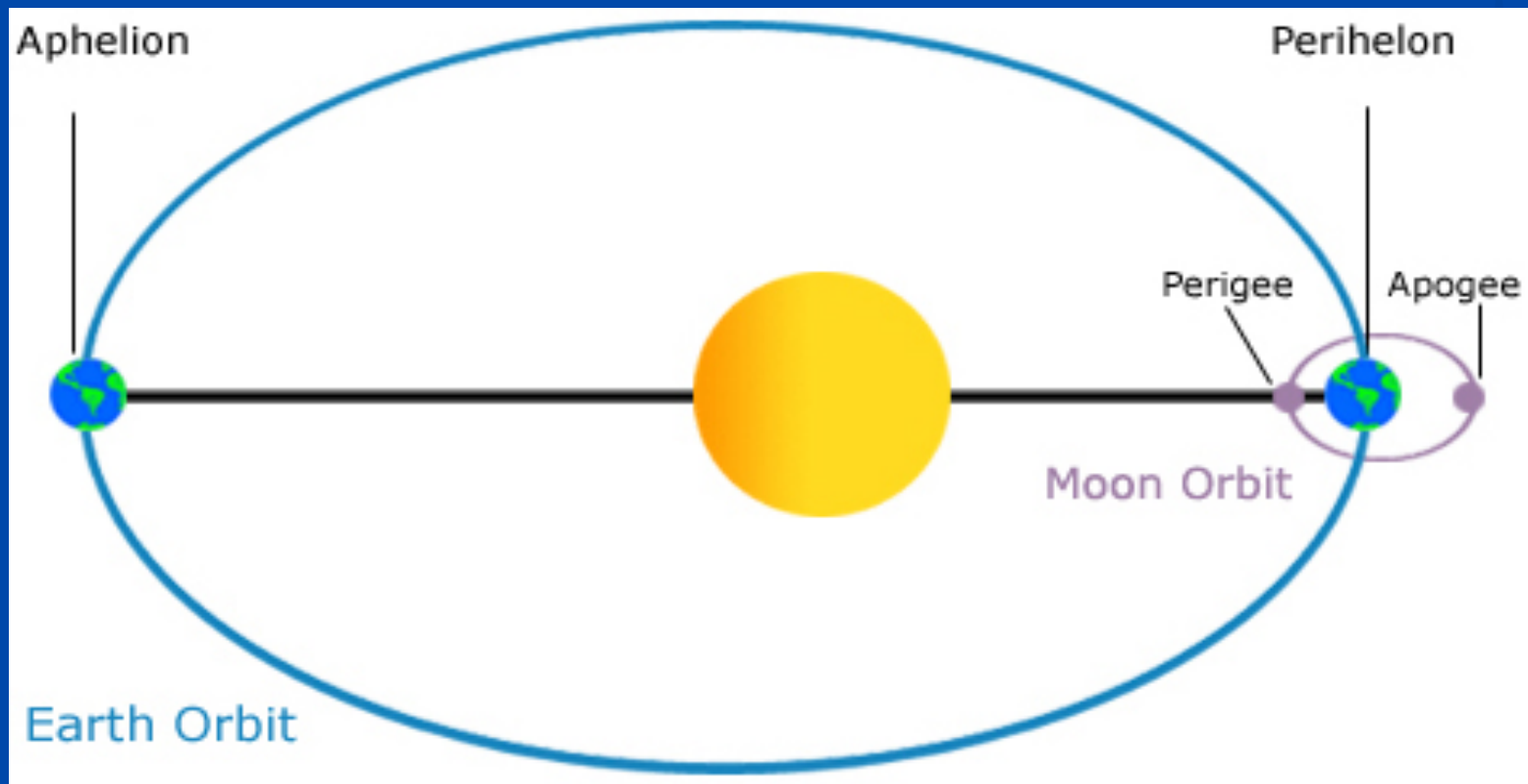


World Climate Changes & El Niño/La Niña

Unit 7 - Ch 19.3

Natural Climate Changes

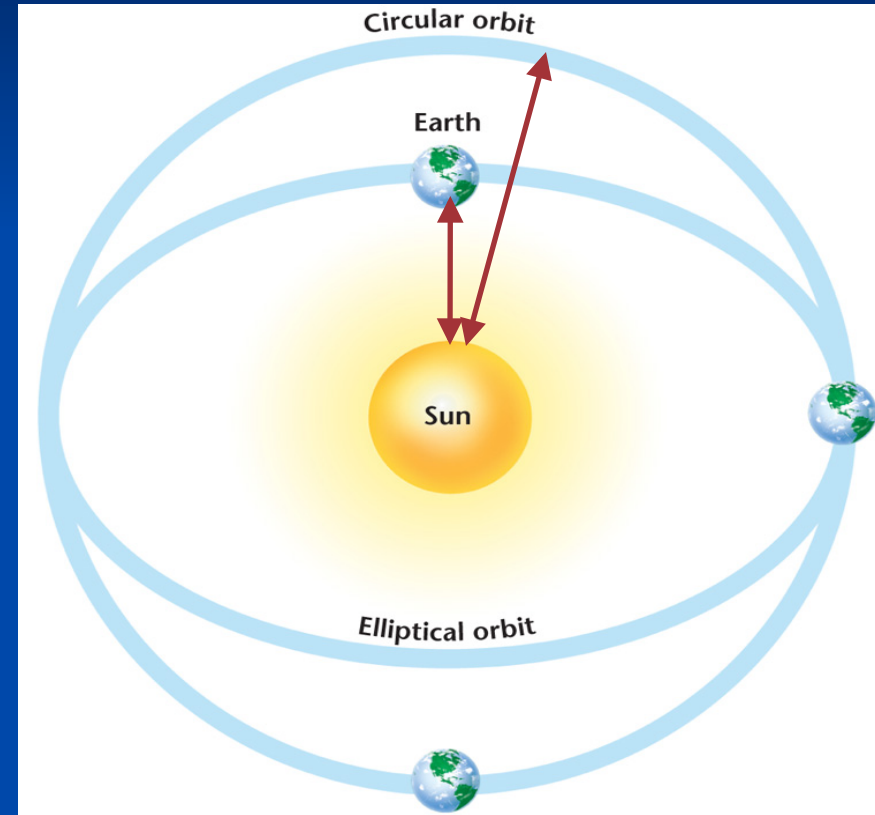
- Earth-Sun Distance = **~92 million miles**
- Change in Earth-Sun distance due to *elliptical orbit* = **~3 million miles**



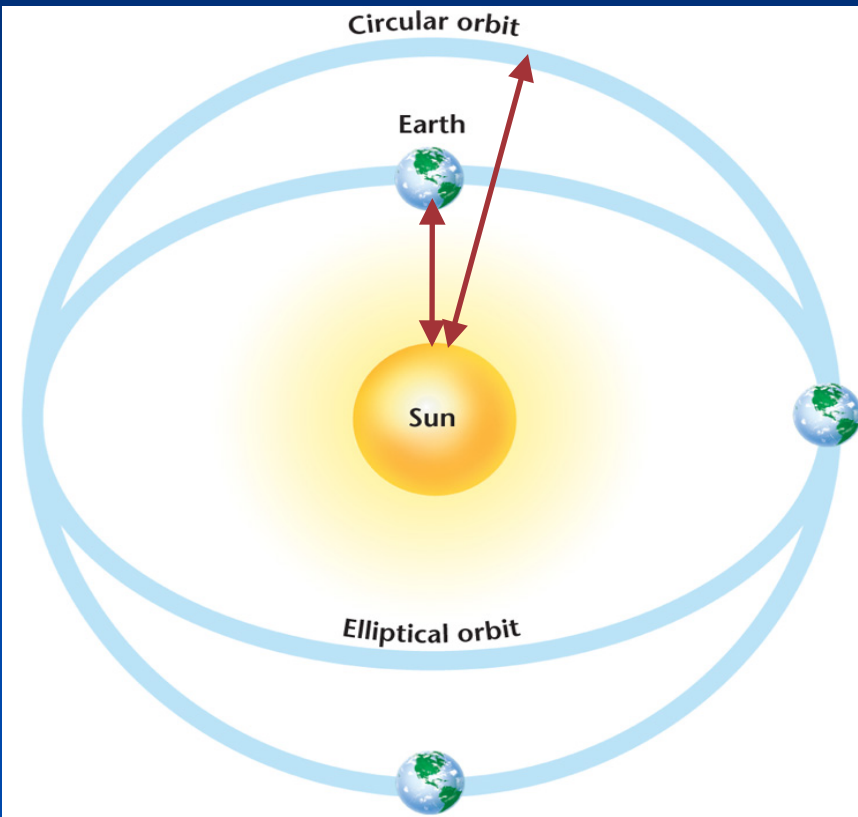
Natural Climate Changes

– *Elliptical* Orbit:

- Earth passes *slightly* **closer** to Sun & average temps are *slightly* **warmer**



Natural Climate Changes

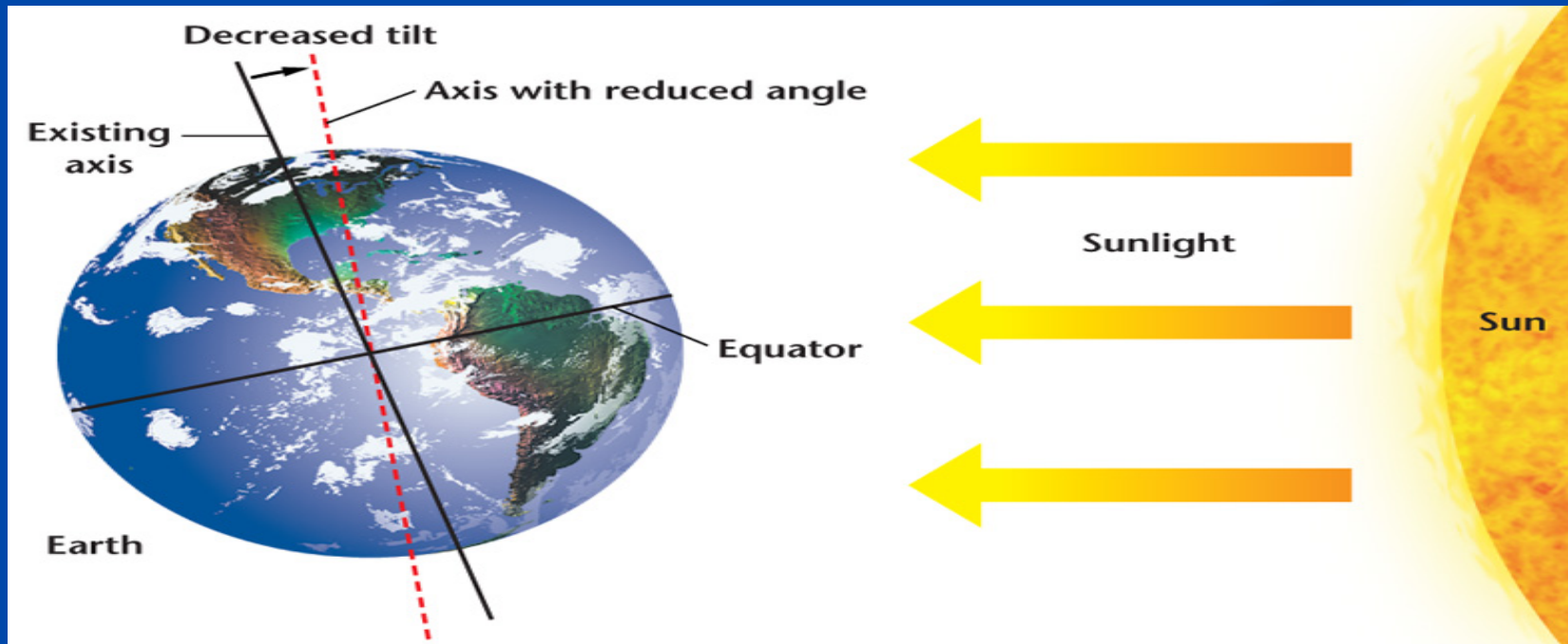


—Circular Orbit:

- Earth *slightly* **farther** from Sun & average temps are *slightly* **cooler**

Natural Climate Changes

- But, change in *elliptical orbit* distance (~ 3 mil miles) is a *relatively* **small percent** to **actual** distance
 - Thus, Earth-Sun distance has **LESS** climatic effect compared to Earth's **seasons** due to **axial tilt**

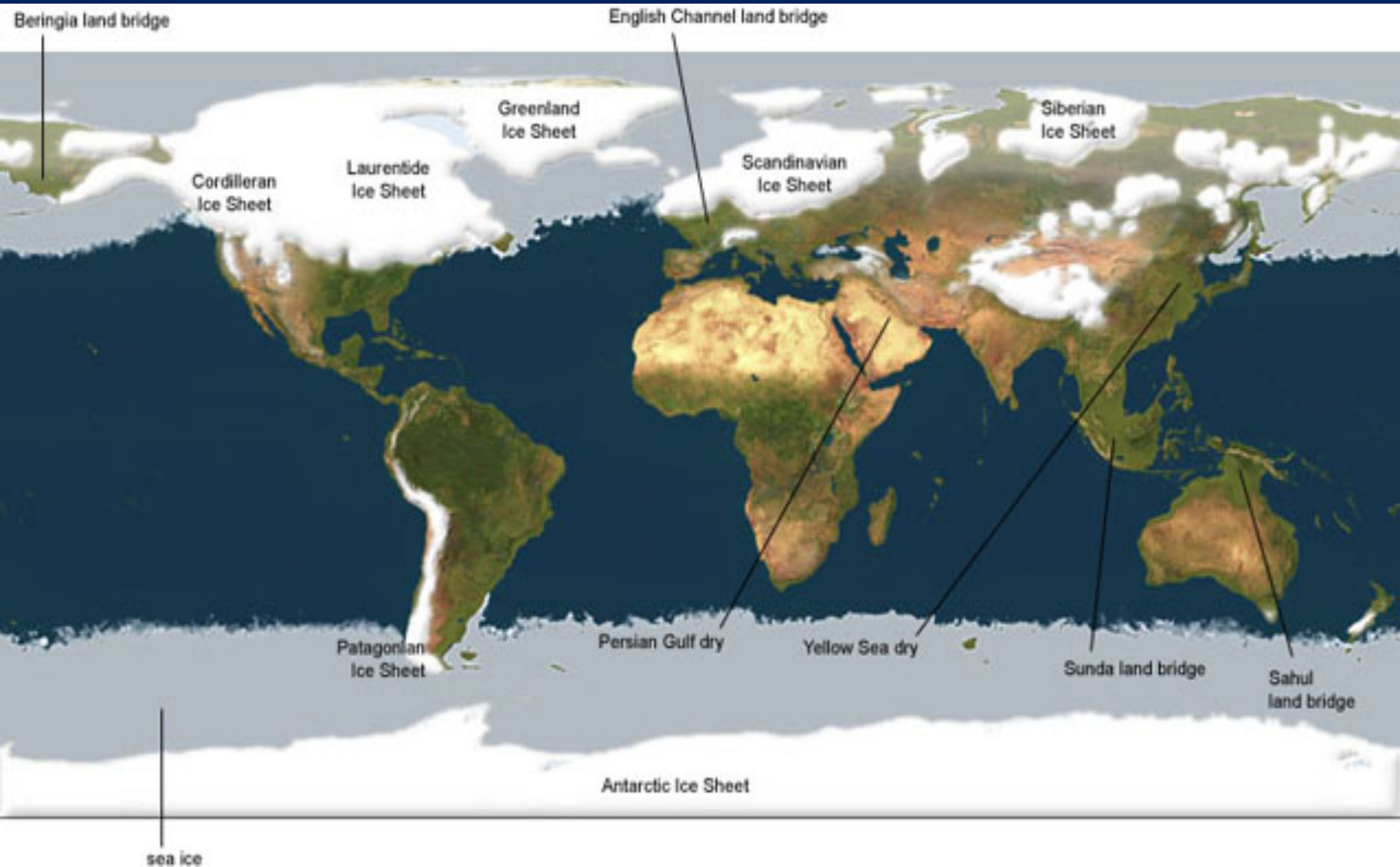


ICE AGES

- Periods where **average global** temps decrease by **$\sim 5^{\circ}\text{C}$ ($\sim 9^{\circ}\text{F}$)** with extensive *glacial* coverage
- Most **recent** ice age ended **$\sim 10,000$ years** ago

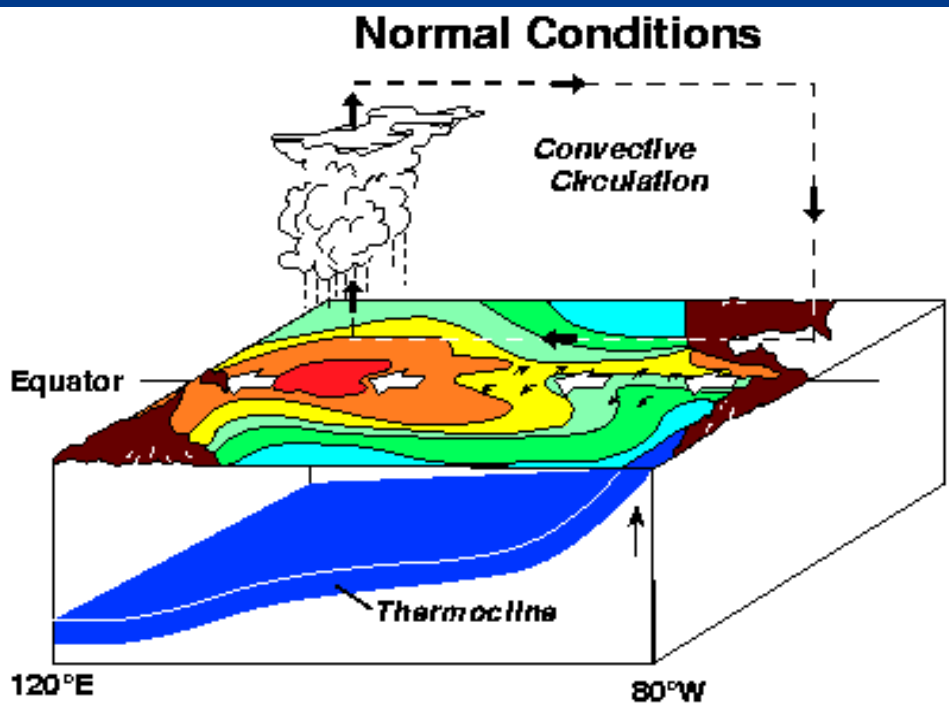


ICE AGES



El Niño & *La Niña* Effects

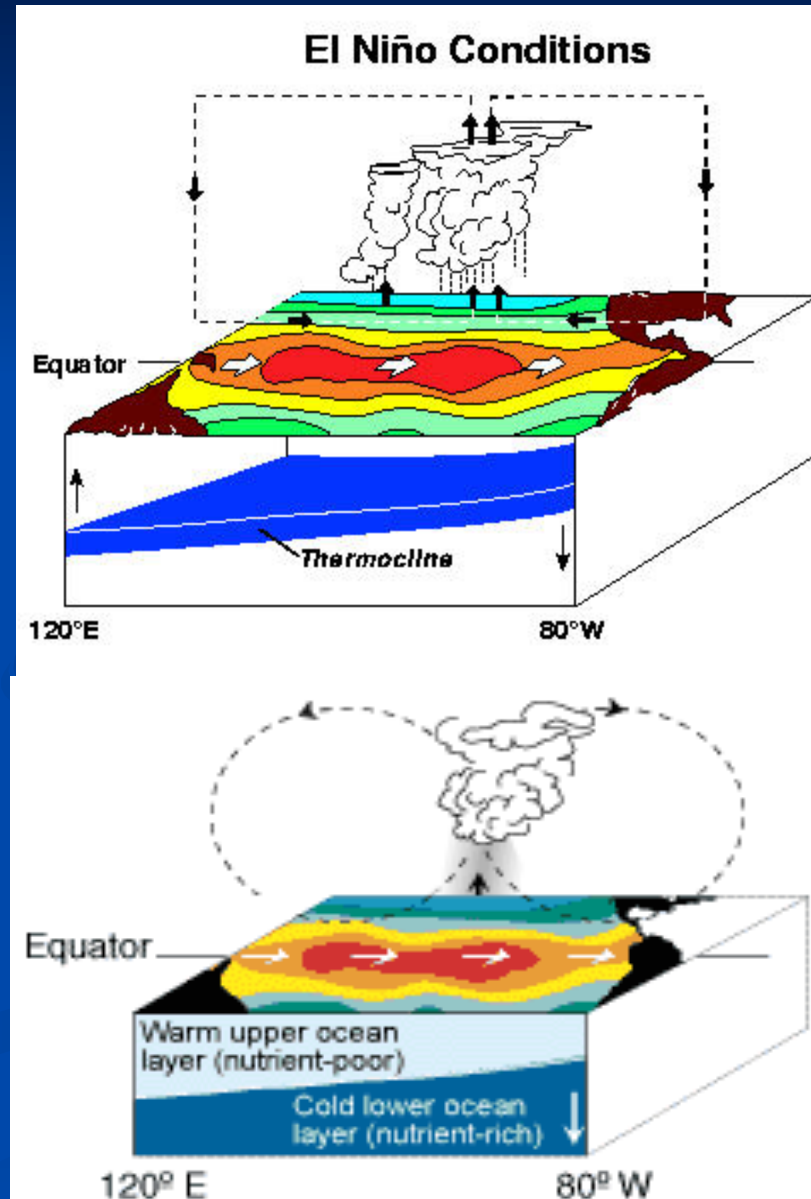
NORMAL Scenario



- *Trade Winds* at the equator move *east-to-west* towards **Western Pacific Ocean**
- Thus moving *warmer* currents from Eastern Pacific to Western Pacific

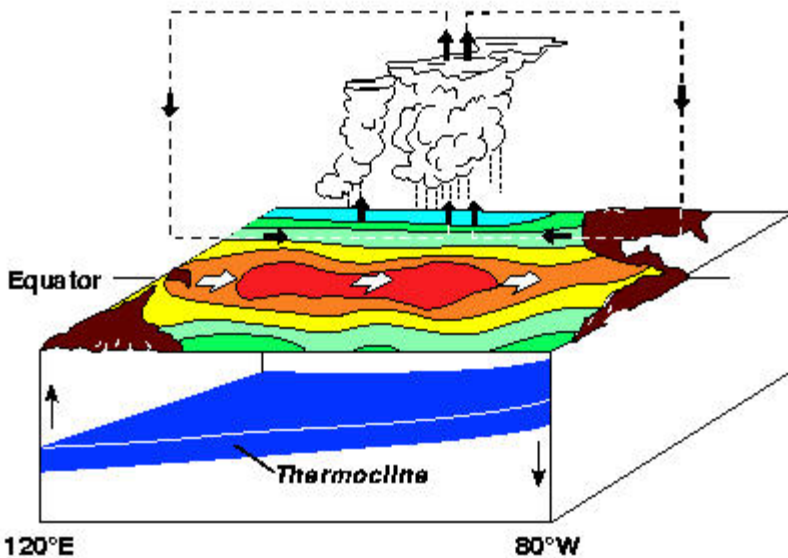
El Niño

- WARM currents that become *STRONGER* in areas of usually *cooler* current
- Replaces normally cooler waters with warm, *equatorial* waters in Eastern Pacific

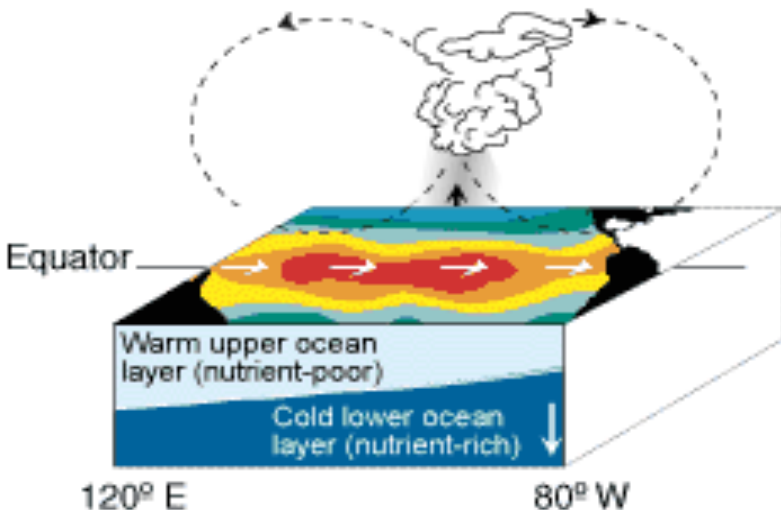


El Niño

El Niño Conditions

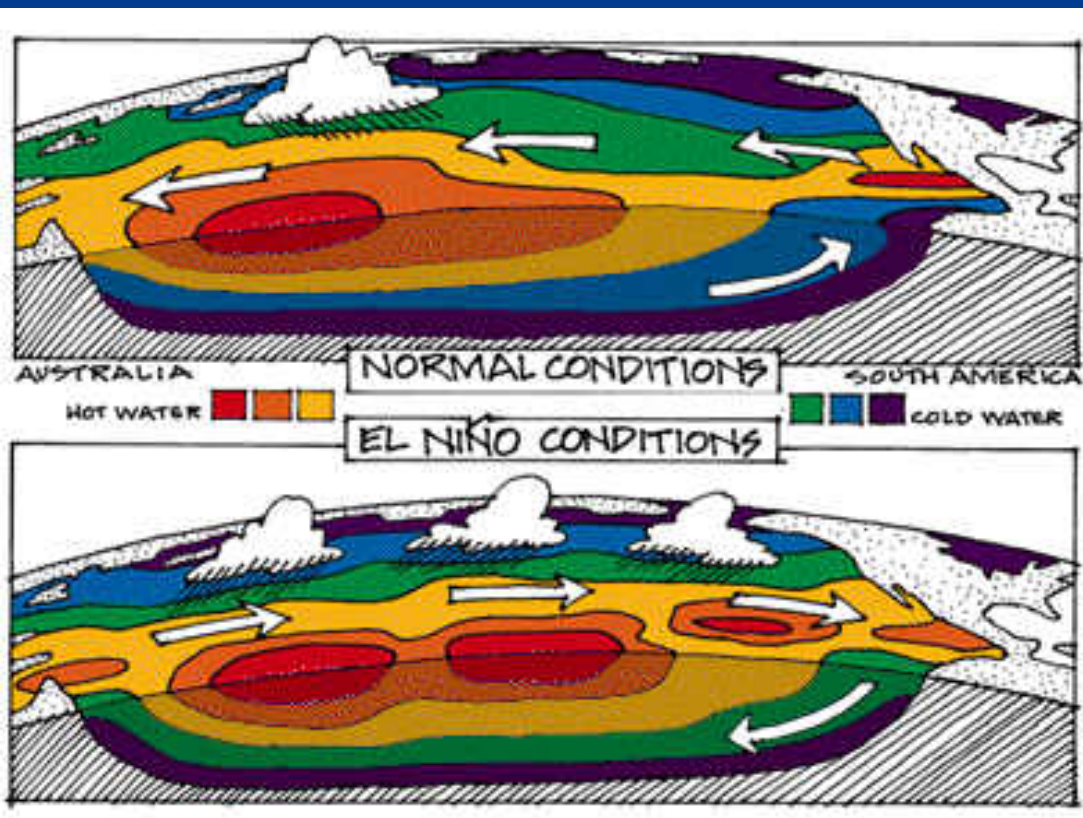


- Due to *WEAK* Trade Winds that *REDUCES* upwelling in Eastern Pacific



- Explains why it is *warmer* than usual in *Eastern Pacific*

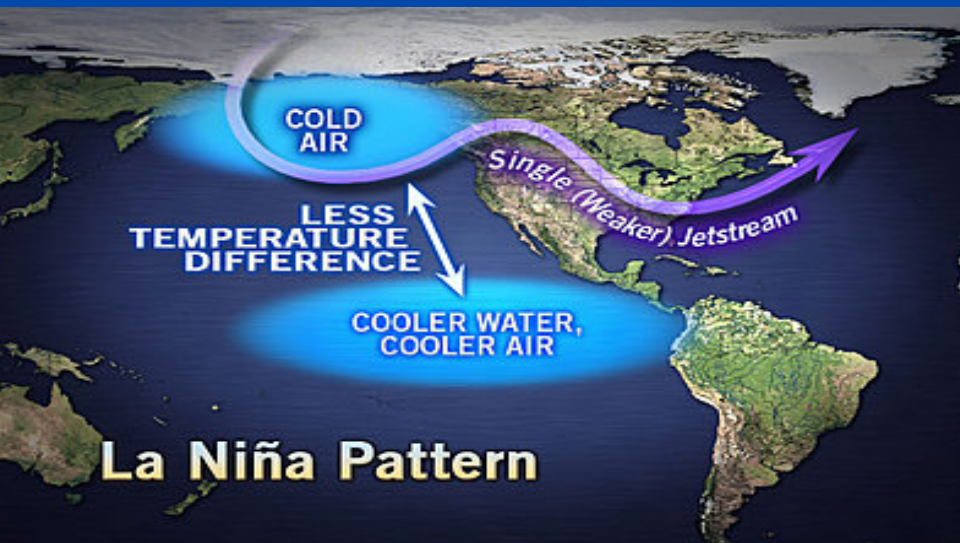
El Niño Effects



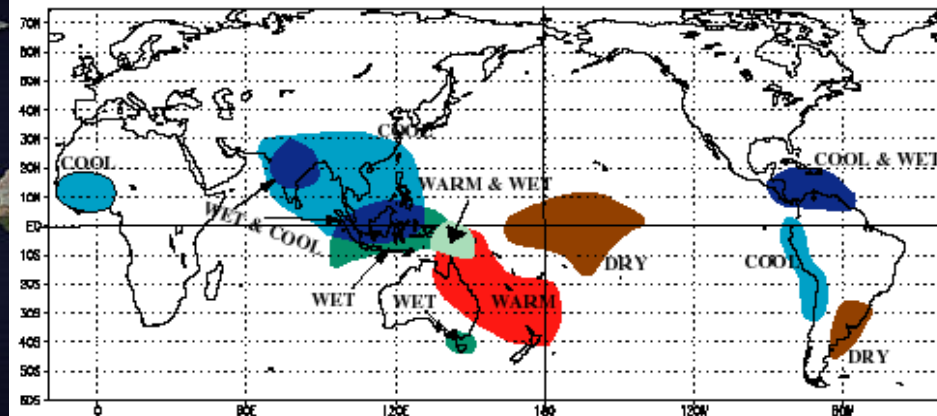
- Brings *abnormal* rain averages to normally *dry* regions

La Niña

- Temps in Eastern Pacific Ocean are much COOLER than average
- Due to STRONG Trade Winds moving westward, and thus INCREASES upwelling in Eastern Pacific

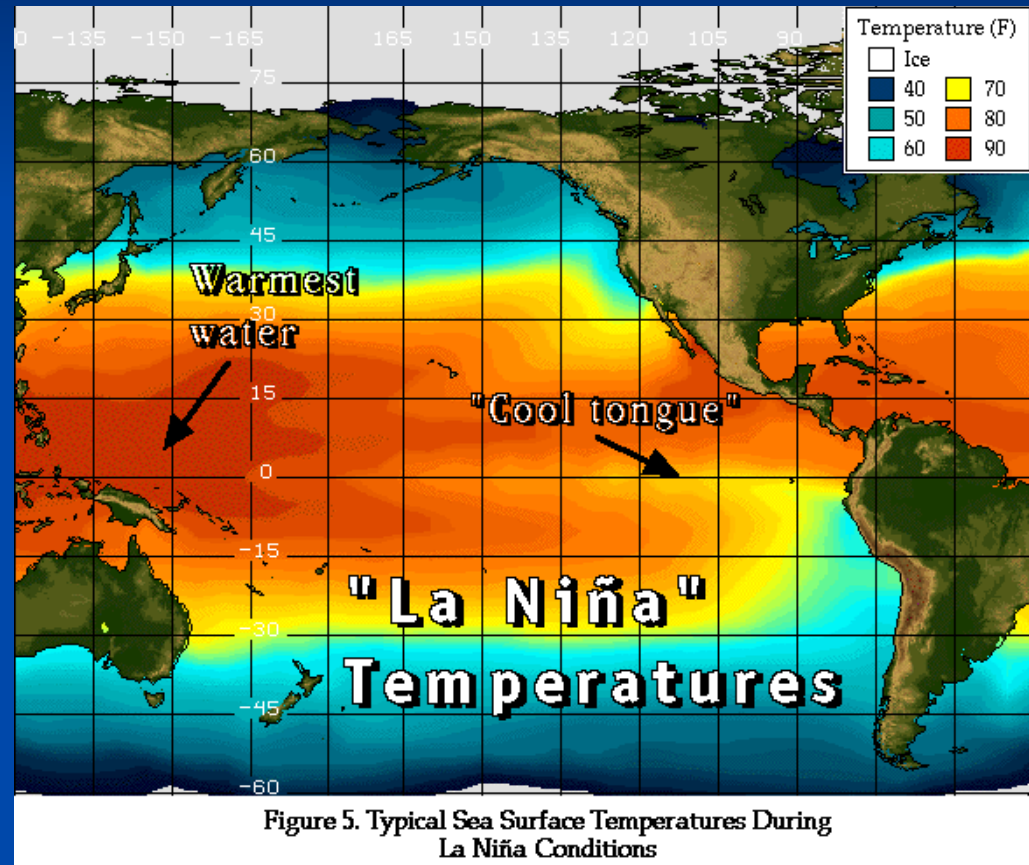


Typical La Niña Weather Patterns, Jun - Aug

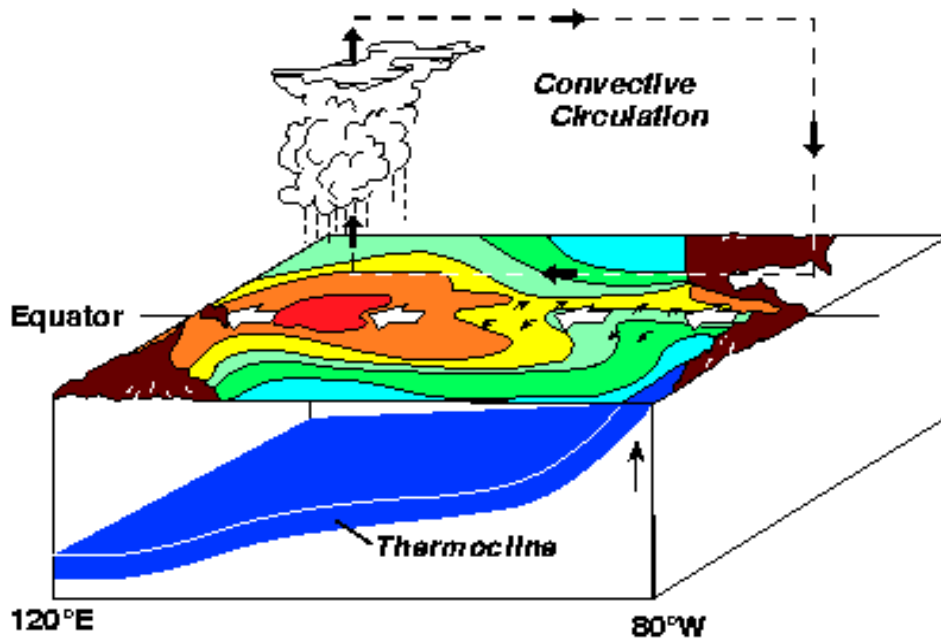


La Niña Effects

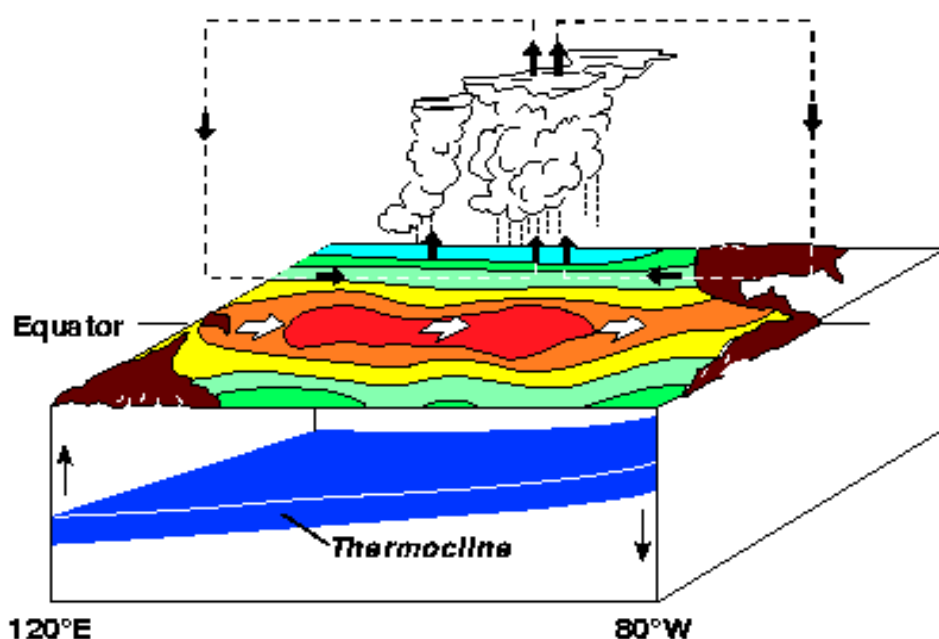
- **Increases**
hurricane
activity in
Eastern Pacific
Ocean



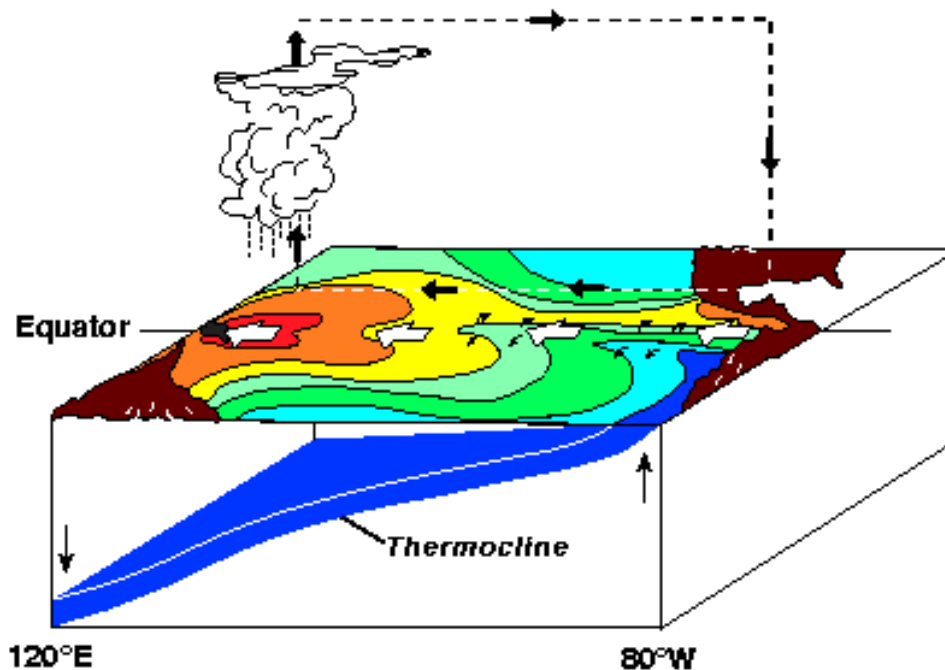
Normal Conditions



El Niño Conditions



La Niña Conditions



El Niño / La Niña

TOPEX/POSEIDON and Jason-1

