

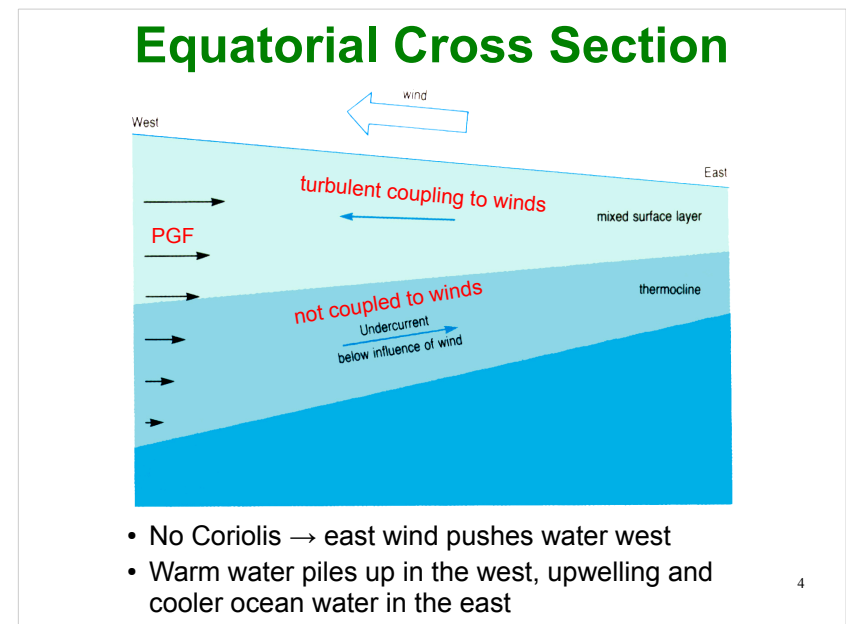
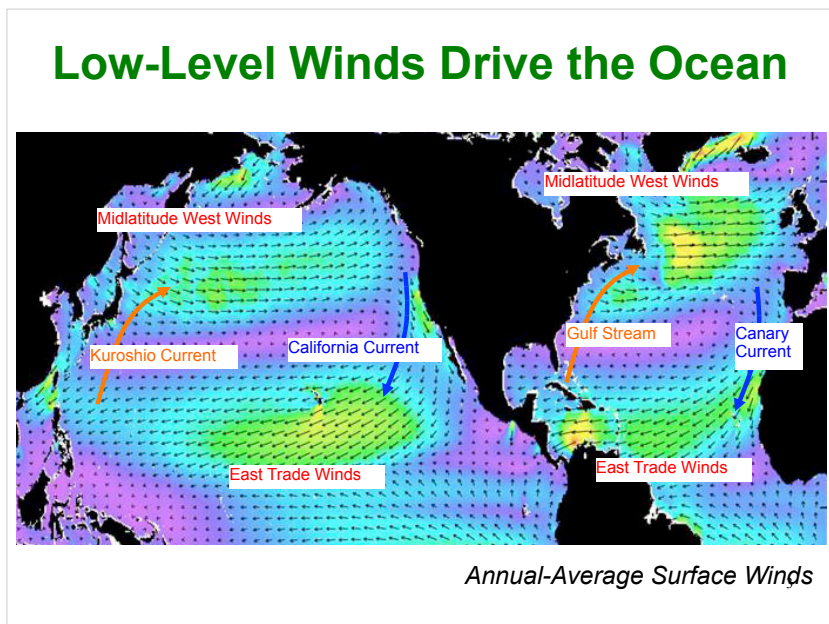
Energy Reservoirs

○ Atmosphere

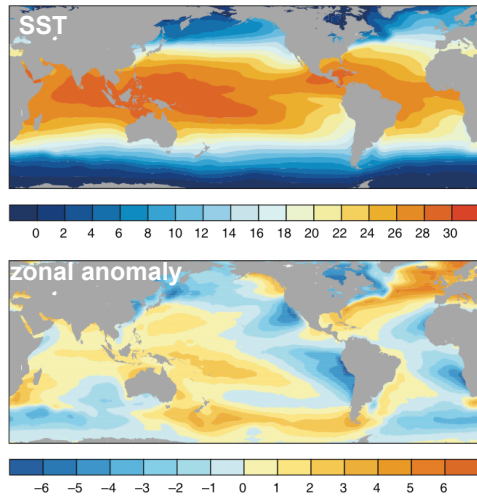
- The oceans are about 4000 m deep on average
- The top 10 m equal the mass of the atmosphere
- The top 3 m equal the heat capacity of the atmosphere!!

The state of the oceans determines the climate on time scales of thousands to millions of years!

2



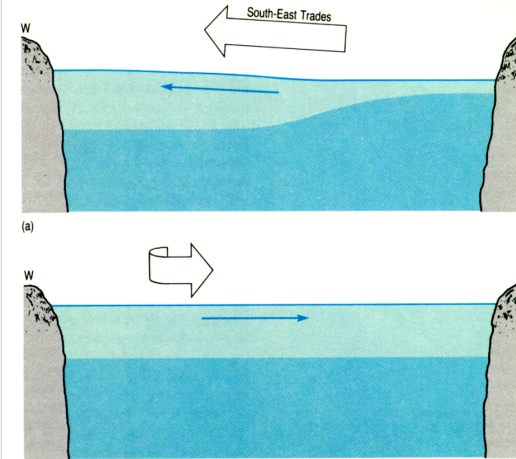
Sea Surface Temperatures



- West Pacific “warm pool”
- Effects of western vs eastern boundary currents!
- Upwelling regions

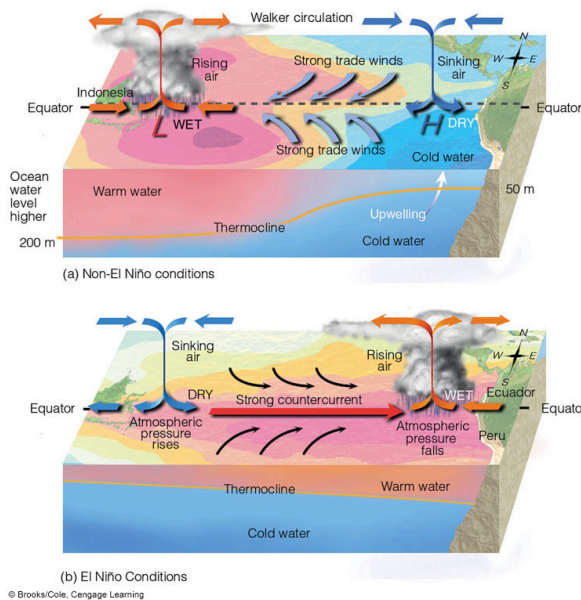
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El Niño



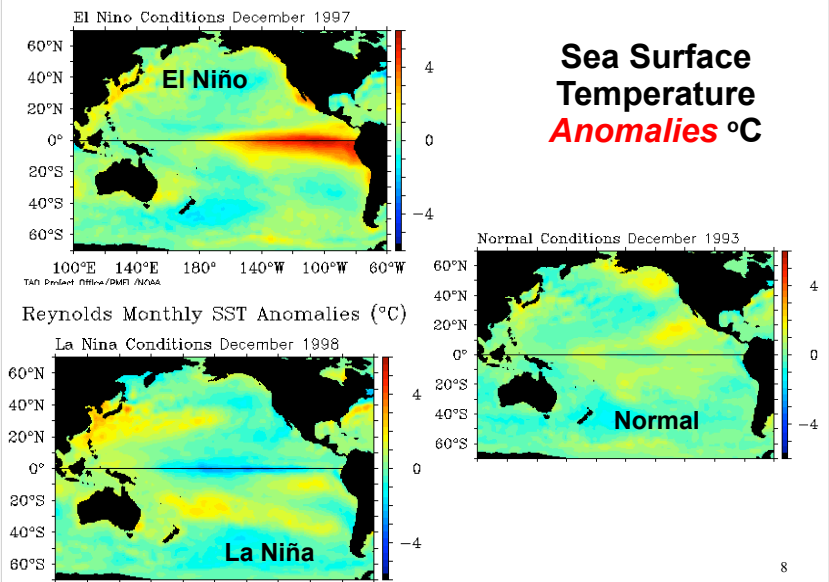
- Normal conditions: huge accumulation of deep warm water in West Pacific
- El Niño: relaxation of trade wind forcing allows warm water to flow eastward

6



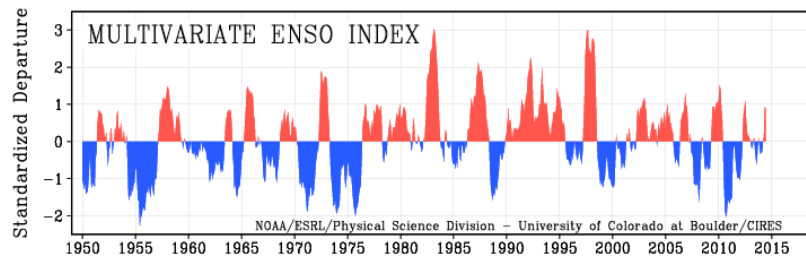
El Niño vs La Niña

7



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El Niño Southern Oscillation (ENSO) updated until present

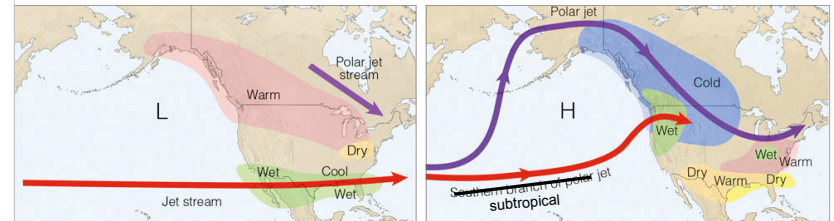


Related to sea surface temperature variations of the tropical pacific

We are currently transitioning into an El Niño phase.

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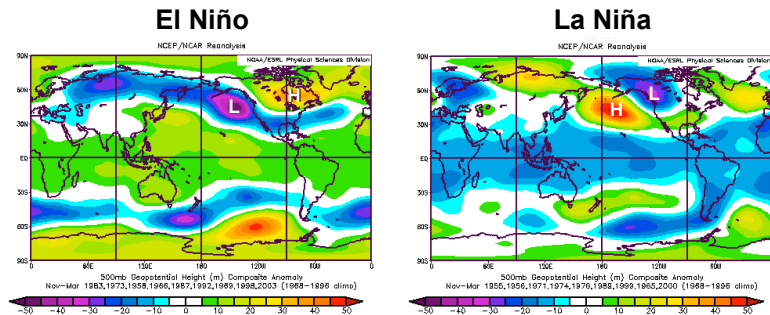
Typical ENSO Winter Weather Patterns across North America



© Brooks/Cole, Cengage Learning

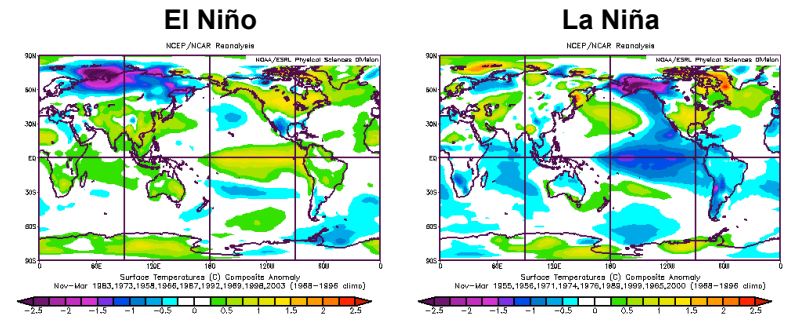
- El Niño:
 - Warm tropical East Pacific SSTs
 - Advection of warm, moist air onto Pacific coast
- La Niña:
 - Cold tropical East Pacific SSTs
 - High pressure splits & deflects jet; western drought

El Niño vs. La Niña Observed 500 hPa Heights



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El Niño vs. La Niña Observed Surface Temperatures



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