Tutorial 10

ENSO!
El-Niño Southern Oscillation

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Normal conditions off west S. America

Eastern Tropical Pacific Currents

North Equatorial Current

South Equatorial Current

Peru Coastal Current

Coastal Upwelling of Nutrient-Rich Bottom Water
Normal Conditions
- Warmer water to the west (LPS) – Rain!
- Cooler water to the east (HPS)
  - Upwelling
- Thermoclines rises in the east
- Drives convective circulation to rise in the west and fall to the east

El-Niño Conditions
- Weakened / Reversed trade winds
- Warmer water spreads further east
- The thermocline lowers to the east
- Convective circulation to now rise in the east and fall to the west

La-Niña Conditions
- Trade winds intensify
- Cooler water spreads further west
- Convective currents rise in the west and fall to the east
70 buoy array moored in the central Pacific, between 160E and 150W and from 5S to 5N, Area is called the Nino-4 Region NOAA TAO. Buoys measure temperature, winds, and currents there. 

http://www.pmel.noaa.gov/tao/
In Figure 10.5 to determine the periodicity of El Nino.

How many El Nino events do you recognize in this figure? ___________
(Keep in mind that “an event” may last for more than a year.)

How many years elapse between El Nino events? _________________

How many La Nina events do you recognize in this figure? _______________
(Recall that La Nina events are cooler than normal.)

How many years elapse between La Nina events? _________________

Are the periodicities of El Nino and La Nina events the same? __________
Explain.
Figure 10-6 shows the locations of selected NOAA TAO buoys from the central equatorial Pacific, with average sea surface temperature (SST) anomaly data from a selected time period.

a.) Contour these data with a 0.5°C interval. See Example above

b.) Do these data indicate either an El Nino or a La Nina event? Yes or No Justify your answer by comparing these data with SST anomaly data in Figure 10.5.
Figure 10-7 shows the locations of selected NOAA TAO buoys from the central equatorial Pacific, with average sea surface temperature (SST) anomaly data from a different time period than in Figure 10-6.

a.) Contour these Figure 10-7 data with a 0.5°C interval.

b.) Compare these results with those in question 2. Based on your analysis of these data, is there anything that you might predict about the future climatic conditions in the west coast of South America?

c.) Do these data indicate either an El Nino or a La Nina event? Yes or No If yes, which type of event? ________________________________.

d.) Assuming one-month time difference between these data and those in question 2, when might the climatic conditions change in Guayaquil, Ecuador (3°S, 82°W)?

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CURRENT CONDITIONS!

- HTTPS://WWW.CLIMATE.GOV/ENSO

“LA NIÑA CONDITIONS ARE PRESENT AND SLIGHTLY FAVORED TO PERSIST (~55% CHANCE) THROUGH WINTER 2016-17.
EL-NIÑO VIDEOS!

- HTTPS://WWW.YOUTUBE.COM/WATCH?V=TYPQ86YM_IC
- HTTP://ESMINFO.PRENHALL.COM/SCIENCE/GEOANIMATIONS/ANIMATIONS/26_NINONINA.HTML
- HTTP://WWW.ESRL.NOAA.GOV/PSD/PEOPLE/JOSEPH.BARSUGLI/ANIM.HTML
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