

HEAT

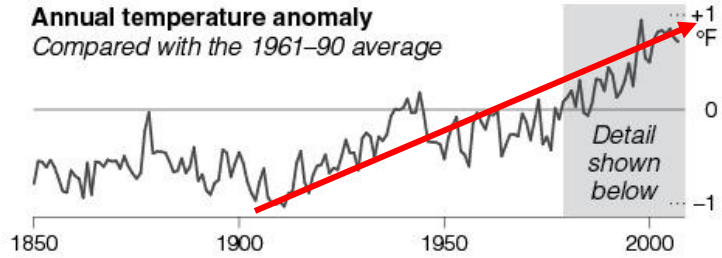
Unit 20 Dr. John P. Cise, Professor of Physics, Austin Com. College, 1212 Rio Grande St., Austin Tx., 78701

jpcise@austincc.edu & New York Times March 2, 2008 by Andrew Revkin

An Unusually Cold Winter

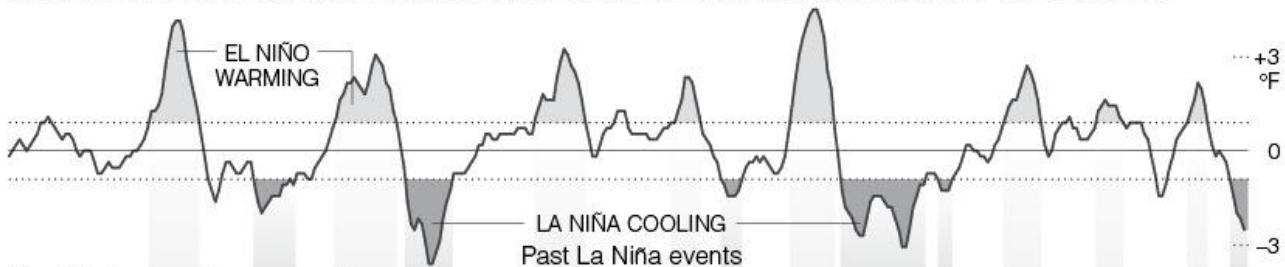
Climate experts say that this winter's drop in average global temperature is probably due to normal weather variation and cooling in the tropical Pacific Ocean, which is in its La Niña phase for a few more months.

Annual temperature anomaly
Compared with the 1961–90 average

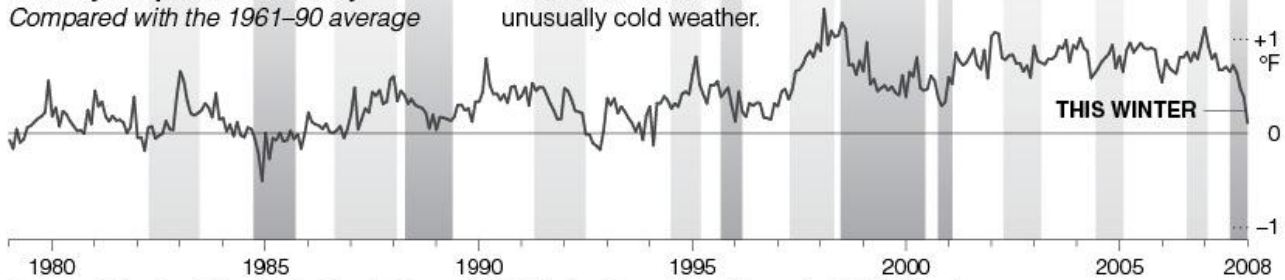


El Niño and La Niña events

Tropical sea surface temperature anomalies in the Pacific Ocean, compared with the 1971–2000 average



Monthly temperature anomaly
Compared with the 1961–90 average



Sources: University of East Anglia Climatic Research Unit; National Oceanic and Atmospheric Administration

THE NEW YORK TIMES

Background: The OCEANS contain 0.328×10^9 cubic miles of water. (a) Find out how many cubic feet of water are in the oceans?

Hint: 5280 feet = 1 mile (b) Since the density of water is 62.4 lb./ft^3 , find the weight (in pounds) of all the water in all the oceans?

(c) The chart above shows that the oceans have risen + 2 degrees F in the past 100 years. Find the amount of heat absorbed by the oceans in the past 100 years? Hint: $Q(\text{heat}) = c(\text{specific heat}) \times \text{mass}(\text{in lb. in English system}) \times \Delta t(\text{temperature change})$. $C(\text{specific heat of water}) = 1 \text{ BTU/lb. degree F}$. Answers: (a) 0.482×10^{20} cubic feet. (b) $\sim 3 \times 10^{21}$ pounds. (c) $\sim 6 \times 10^{21}$ BTUs