

CLIMATE CHANGE AND THE CRYOSPHERE UNIT
Partners with Ellen Mosley-Thompson's Lecture, *The Shrinking Cryosphere*
Lecture Given at Harvard Medical School on April 12, 2005

Link to Lecture Video

http://estream.med.harvard.edu:8080/ramgen/Content/CustomVideo/HHGE/C_04262005085129.rm

Lecture Summary

This presentation provides an introduction to the development of the field of ice core paleoclimatology beginning in the 1930s. The initial results from deep ice cores drilled in Greenland (1966) and Antarctica (1968) provided convincing evidence that glaciers, ice caps and ice sheets contained a wealth of information about local to regional environmental conditions including global scale climate changes. The various chemical and physical properties preserved within ice cores are reviewed along with examples of the climate evidence they provide. The talk also provides a brief review of the development of the technology that has allowed recovery of ice cores from high elevation, tropical and subtropics ice fields in the Andes of South America, the Himalaya in Tibet and Kilimanjaro in Tanzania. Evidence is presented for a large-scale abrupt climate change throughout the low latitudes ~5200 years ago and for a ~300-year drought in East Africa 4200 years ago. Ice core-derived climate histories (inferred from $\delta^{18}O$) recovered from the Tibetan Himalaya and the South American Andes are combined to provide a 2000-year global perspective from which 20th century climate changes may be assessed. Finally, photographic evidence for a near global scale retreat of alpine glaciers is presented.

Key Vocabulary Words for the Climate Change and the Cryosphere Lecture

1. anthropogenic
2. climate variability
3. decadal average
4. deglaciation
5. Holocene Era
6. geophysical survey
7. ice core
8. paleoclimate
9. radiosonde
10. thermocline

Questions to Address During the Climate Change and the Cryosphere Lecture

1. How would sea level rise affect the city or town in which you live? Which U.S. cities would feel some of the most dramatic effects?
2. Is twentieth century warming in the Antarctic Peninsula consistent with past climate variability in the region?
3. Why are ice core records so important in understanding climate history?

Activity: Examining the Connection Between Emerging Diseases and Climate Change

As the spread of disease alters patterns, finds new vectors, and accelerates with new and rapid forms of transportation, it is important to examine the role of climate change. Changing

conditions have resulted in ecosystems which have become "uncoupled" and have changed species distribution. Have the students write and present a basic report about an emergent or re-emergent disease, such as Lyme disease or schistosomiasis. Is climate change an important factor in its spread? Why or why not?

Background Reading

Mosley-Thompson, Ellen and Lonnie G. Thompson. "Ice Core Paleoclimate Histories from the Antarctic Peninsula: Where Do We Go From Here?" *Paleobiology and Paleoenvironments of Eocene Rocks*. Antarctic Research Series, v.76. pp. 335-347. ed. R. Feldmann and J. Stillwell. Washington, DC: American Geophysical Union, 2002.

This reading may be found free-of-charge on the Center for Health and the Global Environment's website at:

<http://chge.med.harvard.edu/programs/education/secondary/hhgec/documents/Antarctic.pdf>

This lesson plan was created by the Center for Health and the Global Environment at Harvard Medical School. Should you have any questions about its content, please feel free to contact Margaret Thomsen, Program Coordinator. She may be reached by telephone at 617-384-8533, or by email at margaret_thomsen@hms.harvard.edu.