

The Archaeology of Climate Change
ANT324L (Unique #31330/#37845)
Fall 2013

Dr. Arlene Rosen

Office: CLA 4.402

Office Hours: Tuesdays 2:30pm – 3:30pm;
Wednesdays 1:30 pm – 2:30 pm, or by appointment

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Time: Tuesday and Thursday, 12:30 – 2:00 pm

Location: SAC 4.174

Course Description: Climate change has impacted human societies over the course of human existence on the planet. It has played a role in everything from hominin evolution to the rise and fall of civilizations through to the present day economic and ethical decision-making. In this course we will examine why climate changes, the methods for recording climate change, and discuss case studies of the varied responses of past human societies to climate change in different geographic regions and time periods with varying socio-political and economic systems. We will explore aspects of resilience and rigidity of societies and issues of environmental sustainability in the past as well as the present. Finally we will compare and contrast modern responses to climate change on a global scale with those of past societies.

Goals: To familiarize students with the evidence for climate change and methods of climate change research; to increase their understanding of the social, economic and technological issues human societies faced in the past when dealing with climate change. To understand what were adaptive and maladaptive human strategies. To help students evaluate the modern politics and social responses to climate change. On successful completion of this course a student should understand how climate change is recorded and the basic climatic record for the period of human occupation of the earth. To be familiar with current debates about how human societies adapt to climate change. To be able to think critically about issues and arguments proposed in the literature, and to write a coherent essay arguing a point of view.

Flags:

Ethics and Leadership

This course carries the Ethics and Leadership flag. Ethics and Leadership courses are designed to equip you with skills that are necessary for making ethical decisions in your adult and professional life. You should therefore expect a substantial portion of your grade to come from assignments involving ethical issues and the process of applying ethical reasoning to real-life situations.

Global Cultures

This course carries the Global Cultures flag. Global Cultures courses are designed to increase your familiarity with cultural groups outside the United States. You should therefore expect a substantial portion of your grade to come from assignments covering the practices, beliefs, and histories of at least one non-U.S. cultural group, past or present.

Requirements: The class will have regular lectures and class discussions; student participation is required. Students are expected to regularly attend all classes, complete the assigned readings in advance of class, and come ready to discuss readings or topics.

In addition to consistent classroom attendance and active participation, each student must complete all of the following:

- 1) Two in-class tests (15% each = 30% total) (**Dates: Oct 1st and Nov 14th 2013**)
- 2) A short (2-minute) in-class presentation (20%) concerning the impact of climate change on past societies (**Dec. 3rd or Dec. 5th, attendance mandatory**)
- 3) One 5 page (maximum) Term Paper (40%) on a topic concerning ethical issues of combating global climate change, past, present or future, **DUE DATE: November 25, 2013**
- 4) Class participation (i.e. active involvement in discussions, attendance, etc.) will count for 10% of the final grade.

Policy on late assignments: A late assignment will only be accepted with prior approval from the instructor. In this case, only a one-week extension of the deadline will be granted and 50% of the points possible will be deducted from the final assignment grade.

Grading Scale: 90 – 100 = A; 80 – 89 = B; 70 – 79 = C; 60 – 69 = D; 59 and below = F

Schedule and Assigned Readings

Subject to change

Theme 1: Tools for Understanding the Human Face of Climate Change

- 1) August 29: Introduction to the Class:** Course organization, assignments and objectives;
- 2) September 3: Historical and Theoretical Background:** Historical background to the discovery that climates change; Theoretical Perspectives: Climatic Determinism (the ‘zip-code lottery’ of climate and culture), Cultural Ecology, Political Ecology; Nature/Culture Debates.

Reading: Rosen, Arlene M. (2007). *Civilizing Climate: Social Responses to Climate Change in the Ancient Near East*. Altamira, Lanham, MD. , Chapter 1, pp. 1-16.

Bolles, Edmund Blair (1999). *The Ice Finders: How a Poet, a Professor, and a Politician Discovered the Ice Age*. Counterpoint, Washington, D.C., Part I, pp. 3-30)

3) September 5: Why does the climate change? Earth's Climates in the Past, Present, and Future: Astronomical Forcing, Solar Cycles, Volcanism, Continental Drift, The Human Factor.

Reading: Ruddiman, William F. (2008). *Earth's Climate: Past and Future*. 2nd ed. W.H. Freeman, New York, Chapter 7, pp. 119-136.

4) September 10: The Impact of Climate Change on Human Communities: ENSO, Human Responses to Climate Change; Perception of Climate Change; Scales of Change; Adaptation; Resilience; Sustainability.

Reading: McIntosh, R. J., J. A. Tainter and S. K. McIntosh. 2000. Climate, history, and human action. In *The Way the Wind Blows: Climate, History, and Human Action*, edited by R. J. McIntosh, J. A. Tainter and S. K. McIntosh, pp. 1-42. Columbia University Press, New York.

Recommended but not Required: Billman, Brian R., and Gary Huckleberry (2008). Deciphering the Politics of Prehistoric El Niño Events on the North Coast of Peru. In *El Niño, Catastrophism, and Culture Change in Ancient America*, edited by D. H. Sandweiss and J. Quilter, pp. 101-128. Dumbarton Oaks and Harvard University Press, Washington D.C.

5) September 12: The Anthropocene: Biodiversity, Quaternary Extinctions, Sea Level Rise, the Ethics of Climate Change.

Reading: Kirch, Patrick V. (2005). Archaeology and Global Change: The Holocene Record. *Annual Review of Environment and Resources* 30(1):409-440.

6) September 17: Reconstructing Past Climate Change: How do we learn about climate change in the past? Isotopic Records from Sea and Ice Cores; Pollen Studies; the Terrestrial Geological Record.

Reading: Roberts, Neil (1998). *The Holocene: An Environmental History*. Blackwell, Oxford, Chapter 2, pp. 8-54.

7) September 19: In Class Exercise: Building and Interpreting a Climatic History
Read the following chapter. Come to class prepared to use the data described in this chapter to construct a climatic sequence graph. Please bring graph paper, pencils, erasers, etc. You will work together in small teams.

Reading: Menking, Kirsten M. (2000). A Record of Climate Change from Owens Lake Sediment. In *The Earth Around Us: Maintaining a Livable Planet*, edited by J. S. Schneiderman, pp. 322-335. Freeman, New York.

Theme 2: Climate Change, Human Origins and Colonization of the Globe

8) September 24: Climate Change and our Early Ancestors; How did global climate change and a catastrophic volcanic blast help shape us?

Ambrose, Stanley H. (1998). Late Pleistocene human population bottlenecks, volcanic winter, and differentiation of modern humans. *Journal of Human Evolution* 34:623-651.

Gibbons, Ann (2013). How a Fickle Climate Made Us Human. *Science* 341:474-479.

9) September 26: Climatic influences on human environments from the Late Pleistocene to the Middle Holocene. Hunter-gatherer adaptations to fluctuating climates; How changing landscapes and coastlines influenced migrations and human adaptations.

Hublin, Jean-Jacques and Wil Roebroeks (2009). Ebb and flow or regional extinctions? On the character of Neandertal occupation of northern environments. *Comptes Rendus Palevol* 8(5):503-509.

Erlanson, Jon M., Michael H. Graham, Bruce J. Bourque, Debra Corbett, James A. Estes and Robert S. Steneck (2007). The Kelp Highway Hypothesis: Marine Ecology, the Coastal Migration Theory, and the Peopling of the Americas. *The Journal of Island and Coastal Archaeology* 2(2):161-174.

10) October 1: In-Class Test

Theme 3: The Role of Climate Change in the Origins and Spread of Agriculture

11) October 3: Did climate change force the origins of agriculture? The critical importance of agriculture for the origins of civilization and complex societies. What was the role of climate change in the beginnings of cultivation?

Richerson, Peter J., Robert Boyd and Robert L. Bettinger (2001). Was Agriculture Impossible during the Pleistocene but Mandatory during the Holocene? A Climate Change Hypothesis. *American Antiquity* 66(3):387-411.

Rosen, Arlene Miller and Isabel Rivera-Collazo (2012). Climate change, adaptive cycles, and the persistence of foraging economies during the late Pleistocene/Holocene transition in the Levant. *PNAS* 109(10):3640-3645.

12) October 8: Spread of Rice Farming and its Impact: The spread of rice farming in the Chinese Neolithic and beyond. How climate influenced farmers – how farmers influenced climate;

Ruddiman, William F. (2005). Chapters 8 and 9, Pp. 76-94 in *Plows, Plagues, and Petroleum: How Humans Took Control of Climate*. Princeton University Press, Princeton.

13) October 10: The Desert vs the Sown: Farmers and pastoral nomads in marginal lands.

Kuper, Rudolph and Stefan Kröpelin (2006). Climate-Controlled Holocene Occupation in the Sahara: Motor of Africa's Evolution. *Science* 313(5788):803-807.

<http://www.sciencemag.org/content/313/5788/803.full>

Fagan, Brian M. (1999). Chapter 11, pp. 203-221 in *Floods, Famines, and Emperors: El Niño and the Fate of Civilizations*. Basic Books, New York.

14) October 15: Discussion Topic: Perceiving and Managing Risk, is it better to be a farmer or forager when climates change? One article-reading assignment will be handed out to each discussion group in the previous week. Groups will assemble in-class and prepare a discussion. Articles to be confirmed (Smith 2001; Asouti and Fuller, Zeder, Bar-Yosef; Rosen, Arlene M. (2010). Natufian plant exploitation: Managing risk and stability in an environment of change. *Eurasian Prehistory* 7(1):117-131.)

Theme 4: Climate Change and the Collapse of Civilizations (Nature pleads “not guilty”)

15) October 17: The Rise and Collapse of Early Bronze Age cities of the Near East (Climate or Culture, Who is to blame?)

Weiss, H., M.-A. Courty, W. Wetterstrom, F. Guichard, L. Senior, R. Meadow and A. Curnow (1993). The genesis and collapse of third millennium North Mesopotamian civilization. *Science* 261:995-1004.

Rosen, Arlene M. (2007). Chapter 7, pp. 128-149 in *Civilizing Climate: Social Responses to Climate Change in the Ancient Near East*. Altamira, Lanham, MD.

16) October 22: Death on the Nile (in class video)

17) October 24: Roman Expansion into the Desert: Better Climate or Good Organizational Skills?

Barker, Graeme (2002). A tale of two deserts: Contrasting desertification histories on Rome's desert frontiers. *World Archaeology* 33(3):488-507.

Rosen, Arlene M. (2007). Chapter 8, pp. 150-171 in *Civilizing Climate: Social Responses to Climate Change in the Ancient Near East*. Altamira, Lanham, MD.

18) October 29: Student-Led Class Discussion: Maya Collapse, Did Climate Change Play a Role?

Diamond, Jared M. (2005). Chapter 5: The Maya collapses, pp. in *Collapse: How societies choose to fail or survive*. Penguin Books, London.

Gill, Richardson B., Paul A. Mayewski, Johan Nyberg, Gerald Haug, and Larry C. Peterson (2007). Drought and the Maya Collapse. *Ancient Mesoamerica* 18 (2007): 283-302.

Kennett, D. J., S. F. Breitenbach, V. V. Aquino, Y. Asmerom, J. Awe, J. U. Baldini, P. Bartlein, B. J. Culleton, C. Ebert, C. Jazwa, M. J. Macri, N. Marwan, V. Polyak, K. M. Prufer, H. E. Ridley, H. Sodemann, B. Winterhalder and G. H. Haug (2012) Development and disintegration of Maya political systems in response to climate change. *Science* 338(6108):788-791.

Lawler, Andrew (2010) Collapse? What collapse? *Science* 330, 12 November 2010: 907-909.

Lucero, Lisa J. (2002). The Collapse of the Classic Maya: A Case for the Role of Water Control. *American Anthropologist* 104:814-826.

McAnany, Patricia A. and Tomás Gallareta Negrón (2010). Bellicose Rulers and Climatological Peril? Retrofitting Twenty-First-Century Woes on Eighth-Century Maya Society. In *Questioning Collapse*, ed. by Patricia A. McAnany & Norman Yoffee, pp. 142-175. Cambridge University Press, Cambridge.

19) October 31: China's Sorrow: Feast and Famine along the Yellow River.

Hilgers, Lauren (2011). Reading the Yellow River. *Archaeology* 64 (2): 18-23.
http://archive.archaeology.org/1103/features/china_han_dynasty_yellow_river.html

Fagan, Brian M. (2008). Chapter 12: China's Sorrow, pp. 213-227, in *The Great Warming: Climate Change and the Rise and Fall of Civilizations*. Bloomsbury Press, New York.

20) November 5: Southeast Asia: Climate Change and the Demise of Angkor, Cambodia

Fletcher, Roland, et al. (2008). The Water Management Network of Angkor, Cambodia. *Antiquity* 82:658-670.

Buckley Brendan M., Kevin J. Anchukaitisa, Daniel Penny, Roland Fletcher, *et al.* (2010). Climate as a Contributing Factor in the Demise of Angkor, Cambodia. *PNAS* 107:6748-6752.

21) November 7: Easter Island

Hunt, Terry L. (2007). Rethinking Easter Island's ecological catastrophe. *Journal of Archaeological Science* 34(3):485-502.

Diamond, Jared M. (2005). Chapter 2: Easter Island, pp. in *Collapse: How societies choose to fail or survive*. Penguin Books, London

22) November 12: The Political Ecology of Drought Cycles in Native America: Cahokia, Native Anasazis, Colonial Spaniards and the Pueblo Revolt.

Spielmann, K. A., T. Clark, D. Hawkey, K. Rainey & S. K. Fish (2009). "...being weary, they had rebelled": Pueblo subsistence and labor under Spanish colonialism. *Journal of Anthropological Archaeology*, 28(1), 102-25

Benson, Larry V., Timothy R. Pauketat, and Edward R. Cook
2009 Cahokia's Boom and Bust in the Context of Climate Change. *American Antiquity*

23) November 14: In Class Test

24) November 19: The Little Ice Age and its impact on the Greenland Norse populations.

Fagan, Brian M. (1999). Chapter 10: The Little Ice Age, pp. 181-201 in *Floods, Famines, and Emperors: El Niño and the Fate of Civilizations*. Basic Books, New York..

Dugmore, A., C. Keller & T. H. McGovern (2007). Norse Greenland Settlement: Reflections on Climate Change, Trade, and the Contrasting Fates of Human Settlements in the North Atlantic Islands. *Arctic Anthropology*, 44, 12-36.

25) November 21: Student Discussion: Societal Responses to Climate Change in Recent History

Hassan, Fekri (2007). Extreme Nile Floods and Famines in Medieval Egypt (AD 930–1500) and their Climatic Implications. *Quaternary International* 173-174:101-112.

Oster, Emily (2004). Witchcraft, Weather and Economic Growth in Renaissance Europe. *Journal of Economic Perspectives* 18:215-228.

Wood, Gillen (2008). The Volcano Lover: Climate, Colonialism, and the Slave Trade in Raffles's 'History of Java'. *Journal of Early Modern Cultural Studies* 8: 33-55.

Scheffran, Jurgen (2008). Climate Change and Security. *Bulletin of the Atomic Scientists* 64(2):19-25, 59-60.

Zhang, David D., Peter Brecke, Harry F. Lee, Yuan-Qing He, and Jane Zhang (2007). Global Climate Change, War, and Population Decline in Recent Human History. *Proceedings of the National Academy of Sciences* 104:19214-19219.

26) November 26: Cataclysmic Climate Change: Secrets of the Dead: Catastrophe! (In-class video)

November 28: No Class – Happy Thanksgiving!

27) December 3: Student Presentations:

Two-minute Presentation Topics: Does climate change force cultural change? Environmental Change, Climatic Opportunism, and Collapse of Past Societies.

Attendance mandatory for both sessions of presentations; 5% subtracted if absent without acceptable excuse (my definition)

28) December 5: Finish Student Presentations; The Ethics of Climate Change in our Modern Age; The impact of global climate change on localities today, how climate change is represented in the media – are there hidden messages behind the coverage?; who controls information about climate change in politics and education? Who will be the ‘winners’ and who the losers with global warming? Global climate change: What Lies Ahead?

Diamond, Jared A. (2005). *Collapse: How Societies Choose or Fail to Succeed*. Viking Press, New York. Chapter 16, ‘The World as a Polder: What Does it all Mean to Us Today?’, pp. 486-525.

Fagan, Brian (2008). *The Great Warming: Climate Change and the Rise and Fall of Civilization*. Bloomsbury Press, New York, chapter 13

van der Leeuw, Sander E. (2008). Climate and Society: Lessons from the Past 10,000 Years. *Royal Swedish Academy of Sciences* 14:476-482.

Additional Information

Disabilities

Students with disabilities may request appropriate academic accommodations from the Division of Diversity and Community Engagement, Services for Students with Disabilities, 512-471-6259, <http://www.utexas.edu/diversity/ddce/ssd/>

UT Honor Code (or statement of ethics) and an explanation or example of what constitutes plagiarism: <http://registrar.utexas.edu/catalogs/gi09-10/ch01/index.html>)

Accommodations for religious holidays: By UT Austin policy, you must notify me of your pending absence at least fourteen days prior to the date of observance of a religious holy day. If you must miss a class, an examination, a work assignment, or a project in order to observe a religious holy day, you will be given an opportunity to complete the missed work within a reasonable time after the absence.

Emergency evacuation: Notice from the Office of Campus Safety and Security, 512-471-5767, <http://www.utexas.edu/safety/>