

HOMININ PALEOECOLOGY

Spring Semester 2012, Mondays 5:10-7:00 PM
BB Seminar Room

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Course Synopsis

This class is a graduate seminar on the paleoecology of hominin species. We begin with the Miocene apes, from which the ancestors of the hominin clade emerged. We then proceed to study key papers on the ecological context of hominin species from *Sahelanthropus tchadensis* to *Homo floresiensis*. Students are expected to gain a deep understanding of current thinking on hominin diet, paleoenvironments, ecological history, and biogeography.

Course objectives

Readings and discussions of the primary literature on hominin paleoecology are the core of this seminar. Students are expected to acquire an understanding of how environments (flora, fauna, landscapes) have changed over geologic time. Students will develop the necessary background to critically evaluate the current literature on hominin paleoecology.

Grading

Because this course is a graduate seminar, attendance and participation are crucial. Students are expected to do the readings carefully, to be prepared to lead discussions on the readings, and to be prepared to answer questions posed during each session. Toward the end of the semester, each student is expected to give a presentation on the paleoenvironments of a paleoanthropological site (e.g., Koobi Fora, Olduvai Gorge, Makapansgat, etc.). Each presentation should take about half an hour.



Tentative schedule

Please note that the course syllabus is a general plan for the course; deviations announced to the class by the instructor may be necessary.

| DATE | TOPIC |
|---------|---|
| Jan. 23 | Introduction to the class |
| Jan. 30 | Miocene apes: inhabitants of tropical rain forests? |
| Feb. 6 | The earliest hominins |
| Feb. 13 | Earliest hominin paleoenvironments: state of the debate |
| Feb. 20 | No class – Presidents' Day |
| Feb. 27 | <i>Australopithecus</i> in East Africa |
| Mar. 5 | <i>Australopithecus</i> in South Africa |
| Mar. 12 | Spring Break |
| Mar. 19 | <i>Paranthropus</i> paleoecology |
| Mar. 26 | Earliest <i>Homo</i> and Plio-Pleistocene environments |
| Apr. 2 | First hominin dispersals out of Africa |
| Apr. 9 | Hominins in Asia |
| Apr. 16 | The Neanderthals |
| Apr. 23 | The emergence of <i>Homo sapiens</i> |
| Apr. 30 | <i>Homo floresiensis</i> and island biogeography |
| May 2 | Presentations |

Readings

Miocene apes (Jan. 30)

Begun, D. R. 2010. Miocene Hominids and the Origins of the African Apes and Humans. *Annual Review of Anthropology* 39:67-84.

Potts, R. 2004. Paleoenvironmental basis of cognitive evolution in great apes. *American Journal of Primatology* 62:209-228.

Singleton, M. 2004. Fossil hominoid diets, extractive foraging, and the origins of great ape intelligence. Pages 298–319 in A. E. Russon and D. R. Begun, editors. *The Evolution of Thought: Evolutionary Origins of Great Ape Intelligence*. Cambridge University Press, Cambridge.

The earliest hominins (part 1 – Feb. 6)

- Vignaud, P., et al. 2002. Geology and palaeontology of the upper Miocene Toros-Menalla hominid locality, Chad. *Nature* 418:152-155.
- WoldeGabriel, G., et al. 2009. The Geological, Isotopic, Botanical, Invertebrate, and Lower Vertebrate Surroundings of *Ardipithecus ramidus*. *Science* 326:65-655.
- Louchart, A., et al. 2009. Taphonomic, Avian, and Small-Vertebrate Indicators of *Ardipithecus ramidus* Habitat. *Science* 326:66-664.
- White, T. D., et al. 2009. Macrovertebrate Paleontology and the Pliocene Habitat of *Ardipithecus ramidus*. *Science* 326:67-93.

The earliest hominins (part 2 – Feb. 13)

- Cerling, T. E., N. E. Levin, J. Quade, J. G. Wynn, D. L. Fox, J. D. Kingston, R. G. Klein, and F. H. Brown. 2010. Comment on the Paleoenvironment of *Ardipithecus ramidus*. *Science* 328:1105.
- White, T. D., S. H. Ambrose, G. Suwa, and G. WoldeGabriel. 2010. Response to Comment on the Paleoenvironment of *Ardipithecus ramidus*. *Science* 328:1105.
- Cerling, T. E., J. G. Wynn, et al. 2011. Woody cover and hominin environments in the past 6 million years. *Nature* 476:51-56.
- Passey, B. H., N. E. Levin, T. E. Cerling, F. H. Brown, and J. M. Eiler. 2010. High-temperature environments of human evolution in East Africa based on bond ordering in paleosol carbonates. *Proceedings of the National Academy of Sciences* 107:11245-11249.

***Australopithecus* in East Africa (Feb. 27)**

- Foley, R. 1984. Early Man and the Red Queen: Tropical African Community Evolution and Hominid Adaptation. Pages 85-110 in R. Foley, editor. *Hominid Evolution and Community Ecology*. Academic Press, London.
- Wynn, J. G. 2000. Paleosols, stable carbon isotopes, and paleoenvironmental interpretation of Kanapoi, Northern Kenya. *Journal of Human Evolution* 39:411-432.
- Kingston, J. D. and T. Harrison. 2007. Isotopic dietary reconstructions of Pliocene herbivores at Laetoli: Implications for early hominin paleoecology. *Palaeogeography, Palaeoclimatology, Palaeoecology* 243:272-306.
- Campisano, C. J. and C. S. Feibel. 2007. Connecting local environmental sequences to global climate patterns: evidence from the hominin-bearing Hadar Formation, Ethiopia. *Journal of Human Evolution* 53:515-527.

***Australopithecus* in South Africa (Mar. 5)**

- Dart, R. 1925. *Australopithecus africanus*: the man-ape of South Africa. *Nature* 115:195-199.
- van der Merwe, N. J., J. F. Thackeray, J. A. Lee-Thorp, and J. Luyt. 2003. The carbon isotope ecology and diet of *Australopithecus africanus* at Sterkfontein, South Africa. *Journal of Human Evolution* 44:581-597.
- Lee-Thorp, J. A., M. Sponheimer, and J. Luyt. 2007. Tracking changing environments using stable carbon isotopes in fossil tooth enamel: an example from the South African hominin sites. *Journal of Human Evolution* 53:595-601.
- Reynolds, S. C., G. N. Bailey, and G. C. P. King. 2011. Landscapes and their relation to hominin habitats: Case studies from *Australopithecus* sites in eastern and southern Africa. *Journal of Human Evolution* 60:281-298.

Paranthropus paleoecology (Mar. 19)

- Wood, B. A. and D. Strait. 2004. Patterns of resource use in early *Homo* and *Paranthropus*. *Journal of Human Evolution* 46:119-162.
- de Ruiter, D. J., M. Sponheimer, and J. A. Lee-Thorp. 2008. Indications of habitat association of *Australopithecus robustus* in the Bloubaan Valley, South Africa. *Journal of Human Evolution* 55:1015-1030.
- Sponheimer, M., B. H. Passey, D. J. de Ruiter, D. Guatelli-Steinberg, T. E. Cerling, and J. A. Lee-Thorp. 2006. Isotopic evidence for dietary variability in the early hominin *Paranthropus robustus*. *Science* 314:980-982.
- Cerling, T. E., E. Mbuja, F. M. Kirera, F. K. Manthi, F. E. Grine, M. G. Leakey, M. Sponheimer, and K. T. Uno. 2011. Diet of *Paranthropus boisei* in the early Pleistocene of East Africa. *Proceedings of the National Academy of Sciences* 108:9337-9341.
- See also this commentary: Lee-Thorp, J. 2011. The demise of "Nutcracker Man". *Proceedings of the National Academy of Sciences* 108:9319-9320.

Earliest *Homo* and Plio-Pleistocene environments (Mar. 26)

- Bobe, R. and M. G. Leakey. 2009. Ecology of Plio-Pleistocene mammals in the Omo-Turkana Basin and the emergence of *Homo*. Pages 173-184 in F. E. Grine, J. G. Fleagle, and R. E. Leakey, editors. *The first humans: origins of the genus Homo*. Springer, Dordrecht.
- Vrba, E. S. 1999. Habitat theory in relation to the evolution in African Neogene biota and hominids. Pages 19-34 in T. G. Bromage and F. Schrenk, editors. *African Biogeography, Climate Change, and Human Evolution*. Oxford University Press, Oxford.
- Kingston, J. D. 2007. Shifting adaptive landscapes: Progress and challenges in reconstructing early hominid environments. *Yearbook of Physical Anthropology* 134:20-58.
- Lee-Thorp, J. A., M. Sponheimer, B. H. Passey, D. J. de Ruiter, and T. Cerling. 2011. Stable isotopes in fossil hominin tooth enamel suggest a fundamental dietary shift in the Pliocene. *Philosophical Transactions of the Royal Society B: Biological Sciences* 365:3389-3396.

First hominin dispersals out of Africa (Apr. 2)

- Carrión, J. S., J. Rose, and C. Stringer. 2011. Early Human Evolution in the Western Palaearctic: Ecological Scenarios. *Quaternary Science Reviews* 30:1281-1295.
- Agustí, J., H. A. Blain, G. Cuenca-Bescós, and S. Bailon. 2009. Climate forcing of first hominid dispersal in Western Europe. *Journal of Human Evolution* 57:815-821.
- Agustí, J. and D. Lordkipanidze. 2011. How "African" was the early human dispersal out of Africa? *Quaternary Science Reviews* 30:1338-1342.
- Tappen, M., D. Lordkipanidze, M. Bukhianidze, and R. Ferring. 2007. Are You in or Out (of Africa?). Pages 119-135 in T. R. Pickering, K. Schick, and N. Toth, editors. *Breathing Life into Fossils: Taphonomic Studies in Honor of C.K. Brain*.

Hominins in Asia (Apr. 9)

- Storm, P. 2001. The evolution of humans in Australasia from an environmental perspective. *Palaeogeography, Palaeoclimatology, Palaeoecology* 171:363-383.
- Dennell, R. W. 2010. The Colonization of "Savannahstan": Issues of Timing(s) and Patterns of Dispersal Across Asia in the Late Pliocene and Early Pleistocene. Pages 7-30 in C. J. Norton and D. R. Braun, editors. *Asian Paleanthropology: From Africa to China and Beyond*. Springer, Dordrecht.

- Ciochon, R. L. 2010. Divorcing Hominins from the *Stegodon-Ailuropoda* Fauna: New Views on the Antiquity of Hominins in Asia. Pages 111-126 in J. G. Fleagle, J. J. Shea, F. E. Grine, A. L. Baden, and R. E. Leakey, editors. *Out of Africa I: The First Hominin Colonization of Eurasia*. Springer, Dordrecht.
- Potts, R. and R. Teague. 2010. Behavioral and Environmental Background to 'Out-of-Africa I' and the Arrival of *Homo erectus* in East Asia. Pages 67-85 in J. G. Fleagle, editor. *Out of Africa I: The First Hominin Colonization of Eurasia*. Springer, Dordrecht.

Neanderthal environments (Apr. 16)

- Finlayson, C. and J. S. Carrion. 2007. Rapid ecological turnover and its impact on Neanderthal and other human populations. *Trends in Ecology & Evolution* 22:213-222.
- Stewart, J. R. 2005. The ecology and adaptation of Neanderthals during the non-analogue environment of Oxygen Isotope Stage 3. *Quaternary International* 137.
- Tzedakis, P. C., K. A. Huguen, I. Cacho, and K. Harvati. 2007. Placing late Neanderthals in a climatic context. *Nature* 449:206-208.
- Gamble, C., W. Davies, P. Pettitt, and M. Richards. 2004. Climate change and evolving human diversity in Europe during the last glacial. *Philosophical Transactions of the Royal Society of London. Series B: Biological Sciences* 359:243-253 (Discussion 253-244.)

The environments of modern human origins (Apr. 23)

- Rector, A. L. and K. E. Reed. 2010. Middle and late Pleistocene faunas of Pinnacle Point and their paleoecological implications. *Journal of Human Evolution* 59:340-357.
- Carto, S. L., A. J. Weaver, R. e. Hetherington, Y. Lam, and E. C. Wiebe. 2009. Out of Africa and into an ice age: on the role of global climate change in the late Pleistocene migration of early modern humans out of Africa. *Journal of Human Evolution* 56:139-151.
- Hallin, K. A., M. J. Schoeninger, and H. P. Schwarcz. 2012. Paleoclimate during Neandertal and anatomically modern human occupation at Amud and Qafzeh, Israel: the stable isotope data. *Journal of Human Evolution* 62:59-73.
- Scholz, C. A., T. C. Johnson, A. S. Cohen, et al. 2007. East African megadroughts between 135 and 75 thousand years ago and bearing on early-modern human origins. *Proceedings of the National Academy of Sciences* 104:16416-16421.

***Homo floresiensis* and island biogeography (Apr. 30)**

- van den Bergh, G. D., H. J. M. Meijer, R. Due Awe, M. J. Morwood, K. Szabó, L. W. van den Hoek Ostende, T. Sutikna, E. W. Saptomo, P. J. Piper, and K. M. Dobney. 2009. The Liang Bua faunal remains: a 95 k.yr. sequence from Flores, East Indonesia. *Journal of Human Evolution* 57:527-537.
- Morwood, M. J. and W. L. Jungers. 2009. Implications of the Liang Bua excavations for hominin evolution and biogeography. *Journal of Human Evolution* 57:640-648.
- Weston, E. M. and A. M. Lister. 2009. Insular dwarfism in hippos and a model for brain size reduction in *Homo floresiensis*. *Nature* 459:85-88.
- Niven, J. E. 2007. Brains, islands and evolution: breaking all the rules. *Trends in Ecology & Evolution* 22:57-59.