

HEB 1212: Climate change and human evolution

Harvard Human Evolutionary Biology, Fall 2020

[Thursdays, 3â€“5pm](#)

Instructor: Daniel Green

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Office Hours: Tuesdays 10am-noon ([link](#))

We live in an age of rapid climatic and environmental change caused by human economic and industrial activity. Paradoxically, our own lineage is thought to have evolved many of its unique behaviors, including bipedalism and novel foraging strategies, in response to environmental shifts driven by climate forcing over the last 8 million years. This course explores the relationship between climate, environment and human evolution. How did hominins and other mammals adapt to global cooling and grassland expansion, particularly in the last five million years? Is there any correlation between climate and the adaptive radiation that produced multiple Australopithecine lineages and the genus *Homo* during the Plio-Pleistocene? How did the glaciations and the environments of Eurasia influence the dispersal of *Homo sapiens* out of Africa? How are anthropogenic climate change and environmental degradation affecting human health, subsistence and conflict today? And how have human communities formulated policies to respond to the global climate crisis? What is the future of our species?

Weekly classes will adopt a seminar format and will be held for two hours, from 3â€“5pm Eastern Standard Time, on Thursdays. The first half hour of every class will begin with a lecture on varied topics including geological processes, methods of past climate reconstruction, or the mechanics of climate change. These lectures will be followed by group activities and then by discussions of weekly readings drawn from primary scientific literature. To facilitate discussion, prior to each class students will submit bullet points that summarize the weekâ€™s readings.

The course will introduce students to concepts explaining the environmentâ€™s impact on adaptation and evolution. Students will also learn about sources of data that make environmental reconstructions possible: animal and plant fossils, stable isotopes, leaf waxes, and soil chemistries, all suggesting how hominins interacted with ancient landscapes. Lastly, the course will review contemporary climate policies, and scientific critiques of climate treaties.

This is an upper-level course in Human Evolutionary Biology that fulfills the departmentâ€™s â€œJunior Research Seminarâ€ concentration requirement. To fulfill this requirement students will develop a research project throughout the semester, ultimately submitting a rough draft, a final 15-page paper, and giving a presentation to other students on their research. In the context of COVID-19, students may choose a project using computer science to evaluate fossil data, or may develop a research project based on primary scientific literature.

Grading will be based on bullet points summarizing weekly readings (20%), participation in discussion (20%), three student presentations (25%), a paper draft (10%), and a final paper (25%).

Topics for each week:

Before the semester, August 20: Introduction to the course ([link here](#))

Week 1, September 3 â€“ Course overview and introductions

Week 2, September 10 â€“ Climate, earth history and evolution

Week 3, September 17 â€“ Cenozoic grasslands and hominin origins

Week 4, September 24 â€“ African mammal radiations in the Plio-Pleistocene

Week 5, October 1 â€“ Debates concerning hominin environments

Week 6, October 8 â€“ Seasonality and energy

Week 7, October 15 â€“ Glaciations and early hominin dispersals

- Climate change and human evolution papers due October 16 (5 pages, double-spaced)

Week 8, October 22 â€“ Physiology and culture outside of the tropics

Week 9, October 29 â€“ Anthropogenic climate change

Week 10, November 5 – The future of climate, human health and conflict

- Final paper prospectus due October 30 (3 pages, double-spaced)

Week 11, November 12 – Student paper presentations

Week 12, November 19 – Climate policy moving forward

Week 13, December 3 – Student research project presentations

- Final papers due December 8 (15 pages, double-spaced)

[Zoom link for classes](#)