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Global Implications of late Pleistocene Megafaunal Extinctions in the Holarctic

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Improved resolution data from radiocarbon, climate and ancient DNA studies of megafauna and humans is providing the first ability to disentangle the roles of climate change and human impact in the Late Pleistocene megafaunal extinctions. In the Holarctic we find that megafaunal populations underwent repeated local or global extinctions apparently associated with abrupt, centennial to millennial duration warming events (Dansgaard-Oeschger interstadials). Importantly, the extinction events took place both before and after the arrival of modern humans in the landscape. Here we look at the possible role of human activity in Holarctic and suggest it may be through the disruption of metapopulation processes which stabilize ecosystems and may have evolved to provide resilience to rapid and frequent climate shifts in the past.

The observed relationship between climate and humans on megafaunal populations may provide a model for global extinction. Fortunately in this regard, the rapid movement of the first Native Americans throughout both American continents during the Last Deglaciation provides a powerful and unique model system for testing the competing roles on extinction because the opposing climate trends in each hemisphere at the time. Here we show that while megafaunal extinctions were associated with warming trends in both cases, the out-of-phase climate patterns caused the sequence and timing of events to be mirrored, providing a unique high-resolution view of the interactions of human colonization and rapid climate change on megafaunal ecosystems, with implications for future warming scenarios.

References:

Cooper, A., Turney, C., Hughen, K.A., Brook, B.W., McDonald, H.G., Bradshaw, C.J.A., 2015. Abrupt warming events drove Late Pleistocene Holarctic megafaunal turnover. Science 349, 602-606.

Metcalf, J.L., Turney, C., Barnett, R., Martin, F., Bray, S.C., Vilstrup, J.T., Orlando, L., Salas-Gismondi, R., Loponte, D., Medina, M., De Nigris, M., Civalero, T., Fernández, P.M., Gasco, A., Duran, V., Seymour, K.L., Otaola, C., Gil, A., Paunero, R., Prevosti, F.J., Bradshaw, C.J.A., Wheeler, J.C., Borrero, L., Austin, J.J., Cooper, A., 2016. Synergistic roles of climate warming and human occupation in Patagonian megafaunal extinctions during the Last Deglaciation. Science Advances 2, doi: 10.1126/sciadv.1501682.