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REPLY TO WAINWRIGHT AND AYALA:

Synchronicity of climate and cultural proxies around 8.2 kyBP at Çatalhöyük

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We are surprised at Wainwright and Ayala's (1) unjustified critique of our recent report in PNAS (2).

First, we openly acknowledge that the changes in $\delta^2H_{18:0}$ values are not statistically significant; indeed, we report a *P* value of 0.10 (*t* test) and a relatively high SD within each phase (7‰) (2). Thus, the points made by Wainwright and Ayala (1) add little to what we discuss in our paper. Notwithstanding this, our proxy provides a new way of deriving precipitation-related climate records from archaeological sites as a means of exploring links between climatic and cultural changes in human prehistory, a matter they seem to dismiss prematurely in promoting their seemingly antienvironmental-determinism arguments.

Second, Wainwright and Ayala (1) argue that "there is no foundation for a teleconnection between Greenland and Nar." We strongly disagree. This connection was already made by Dean et al. (3) about Nar. Extensive literature describes teleconnections between the 8.2-kyBP event and climate change in eastern Europe and beyond for both temperature and precipitation (e.g., ref. 4). A review of model simulations (5) shows statistically significant changes over Eurasia, including Turkey. Hence, the scientific consensus is to expect a climate signal.

Third, we also examined changes in $\delta^{18}O$ values. Previous work showed that changes were sensitive to initial conditions; hence, it is inappropriate to use ensemble means. In practice, a more detailed analysis would require presenting the results in a probabilistic framework. However, the climate modeling was not our main purpose; we used these results to test the hypothesis that a change in $\delta^{18}O$ values was plausible.

Fourth, the off-site proxy from the Nar Lake (3) was used to show similar trends to our δ^2H lipid records and $\delta^{18}O$ carbonate records in the region. Dean et al. (3) state clearly that their data represent changes in lake water balance and thus cannot provide evidence for warming/cooling during the 8.2-kyBP event. Also, Nar Lake was 160 km away from Çatalhöyük. Wainwright and Ayala (1) thus overlook our capability to provide high-precision–dated precipitation-related climate records at the very location where people lived.

Fifth, they also state that the paleoenvironmental record at Çatalhöyük suggests no significant changes at this time. In fact, previous studies (e.g., ref. 6) show a significant well-dated change in off-site stratigraphy just before 8.1 kyBP. Whether or not this was influenced by the climate event, the local environment at Çatalhöyük saw important changes around this time.

Finally, they incorrectly suggest we argue for the collapse of Çatalhöyük during the 8.2-kyBP event. It has been reported previously that the East Mound was uninterruptedly occupied until 5950 BC, with redesigning of its architecture and settlement pattern around 6100 BC (7). Toward the end of the seventh millennium, the West Mound settlement was created and both settlements coexisted for short period of time before the East Mound was abandoned (8). It is indisputable that developments around 6200 BC significantly accelerated changes across the Near East and that "profound human responses are clearly visible in the archaeological record." However, as to whether these changes were driven by local or regional climate impacts is hypothetical; our approach of combining different lines of evidence to test such a hypothesis would seem to be a perfectly reasonable nuanced approach.

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