



## News Notes

### Geoarcheology

## Mesopotamian climate change

Geoscientists are increasingly exploring an interesting trend: Climate change has been affecting human society for thousands of years. At the American Geophysical Union annual meeting in December, one archaeologist presented research that suggests that climate change affected the way cultures developed and collapsed in the cradle of civilization — ancient Mesopotamia — more than 8,000 years ago.

Archaeologists have found evidence for a mass migration from the more temperate northern Mesopotamia to the arid southern region around 6400 B.C. For the previous 1,000 years, people had been cultivating the arable land in northern Mesopotamia, using natural rainwater to supply their crops. So archaeologists have long wondered why the ancient people moved from an area where they could easily farm to begin a much harder life in the south.

One reason could be climate, said Harvey Weiss, an archaeologist at Yale University, at the meeting in December. The climate record in ancient Mesopotamia and around the world shows an abrupt climate change event in 6400 B.C., about 8,200 radiocarbon years before present. A period of immense cooling and drought persisted for the next 200 to 300 years.

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**-Peter deMenocal, Columbia University**

When the severe drought and cooling hit the region, there was no longer enough rainwater to sustain the agriculture in the north, Weiss says. And irrigation was not possible due to the topography, so these populations were left with two subsistence alternatives: pastoral nomadism or migration.

Archaeologists first start seeing evidence of settlements in southern Mesopotamia shortly after 6400 B.C. In the south, an area too arid to have sustained rain-fed agriculture, irrigation from the Tigris and Euphrates rivers would have been possible where the rivers flow at plain level, Weiss says. Irrigation farming took three to four times the labor effort of rain-fed farming, but irrigation agriculture would have made surplus production easier because the yield was double that of rain-fed agriculture. Surplus production meant that people could begin specializing in full-time crafts rather than relying exclusively on farming, Weiss says, thus giving rise to the first class-based society and the first cities.

"It's perhaps too extreme to say that climate change caused all of the advanced society collapses," says Peter deMenocal, a paleoceanographer at Columbia University's Lamont-Doherty Earth Observatory. "But it's also too extreme to say that climate change has had no effect. The challenge to us as paleoclimatologists is to develop much more detailed and well-dated records," he says.

The most fundamental question in Mesopotamian archaeology, Weiss concludes, "is, 'why is there a Mesopotamian archaeology?'" Having already tied the Early Bronze Age collapses from the Aegean to the Indus to the abrupt climate change event 4,200 years before present, Weiss believes he can now tie the changes of lifestyle and migration that were essential for early class formation and urban life in Mesopotamia to an abrupt, multi-century shift toward drier conditions which occurred near 8,200 years before present.

**Megan Sever**

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