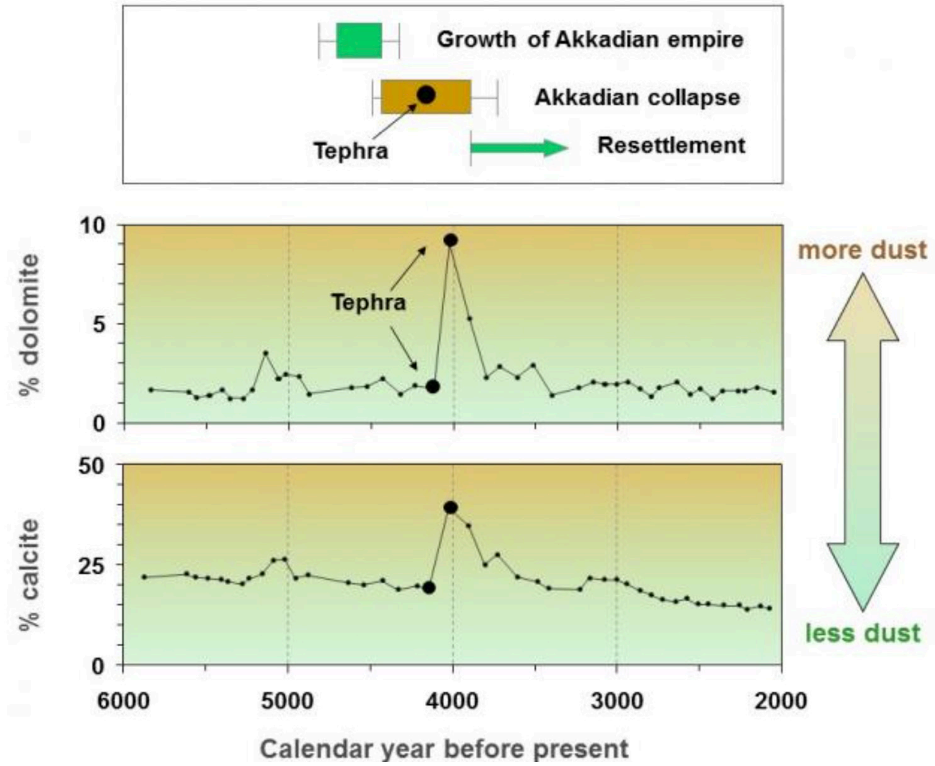
Drought and the Akkadian Empire

"The large fields produced no grain
The flooded fields produced no fish
The watered garden produced no honey
and wine..."
--From "The Curse of Akkad," written circa 4,000 BP

Around 4,300 years BP, Sargon of Akkad united city-states of Mesopotamia (present-day Syria and Iraq) into the world's first empire. The empire consisted of two distinct regions: productive rain-fed agricultural regions in the north and the irrigated alluvial plain between the Tigris and Euphrates Rivers in the south. The Akkadian Empire flourished for about 100 years until, at 4,170 ± 150 years BP, it suddenly collapsed (Weiss et al. 1993). The city of Tell Leilan in the northern region was abandoned and covered with one meter of windblown silt (Weiss et al. 1993). Refugees from the north moved to the southern lowlands. Eventually, about 300 years later, the north was resettled, but the preceding events had destabilized the region and altered the political structures.

For some time, researchers attributed the collapse to political disintegration and invasion by hostile groups. Some paleoclimate records indicate that a catastrophic drought also occurred around this time and suggest that climate factors beyond the control of the empire played a role in its demise.

In a deep-sea sediment core collected in the Gulf of Oman, there are distinct peaks of the minerals calcite and dolomite that begin at 4,025 ± 125 BP and last for about 300 years (Cullen et al. 2000). These minerals are transported to the Gulf of Oman as dust from the dry, windswept regions of Mesopotamia. Scientists interpret these peaks as coming from an abrupt drying of the Tigris and Euphrates floodplains. In the sediment cores, there is a volcanic ash layer (tephra) observed in two adjacent samples spanning the start of the mineral peaks. The geochemical composition of this tephra matches that of another tephra preserved at Tell Leilan from the time of the collapse. This correspondence makes it very likely that the increase in windblown silt and the collapse of the Akkadian Empire happened at the same time.



This comparison of data from Gulf of Oman marine sediments and archeological findings shows the synchrony of the collapse of the Akkadian Empire with severe climatic changes, including the abrupt onset of drought as indicated by dust deposition (Cullen et al. 2000).

Paleoclimatic data from other sites also document significant changes in climate throughout the region, including precipitation reductions of up to 30% between 4,200 and 4,000 years BP inferred from cave deposits in present-day Israel (Bar-Matthews et al. 2003). Evidence for a dry spell of several hundred years also exists from cave deposits in Italy and India, marine sediments from the Red Sea and Arabian Sea, and an ice core from Mount Kilimanjaro in Africa (Thompson et al. 2002; Staubwasser et al. 2003; Arz et al. 2006; Drysdale et al. 2006; Berkelhammer et al. 2012).

The cause of the abrupt drought around 4,200 years BP is still unknown. One suggested cause is a cooling of the North Atlantic. The modern instrumental record shows that droughts in Mesopotamia occur when North Atlantic sea surface temperatures are anomalously cool. Another possibility is that changes in tropical sea surface temperature in the Indian Ocean and western Pacific initiated droughts across the Middle East, India, and East Africa. Regardless of the cause of the abrupt drought, the combined archaeological and paleoclimate evidence, provide strong evidence for climate change playing an important role in the collapse of this complex society.

Some important datasets related to drought around 4,200 years ago:

- Cullen et al. (2000), sediment data for core M5-422 from the Gulf of Oman
- Thompson et al. (2002), dust data from Kilimanjaro ice core
- Bar-Matthews et al. (2003), speleothem $\delta^{18}O$ data from Soreq Cave in Israel
- Staubwasser et al. (2003), $\delta^{18}O$ data for core 63KA from the Arabian Sea
- Arz et al. (2006), sediment data for core GeoB 5836-2 in the Red Sea
- Drysdale et al. (2006), speleo-them geochemical data from Buca della Renella in Italy
- Berkelhammer et al. (2012), speleothem data from Mawmluh Cave in India