

Little effect of environmental changes on prehistorical civilization evolution in Tarim Basin, NW China

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Efforts to understand the mode and strategy of past cultural response to climate change may prove instructive for estimating modern societal policy for an irreversible changing and uncertain future. To date, however, the impact of climate on civilization is open to debate; climate may play as a key role, a supporting player, or a background noise on civilization evolution. We present here a case study from the hyperarid southern Tarim Basin. Durations of ancient relics are placed in a climatic context to evaluate the role of climate's impact on ancient migrations and cultural evolution.

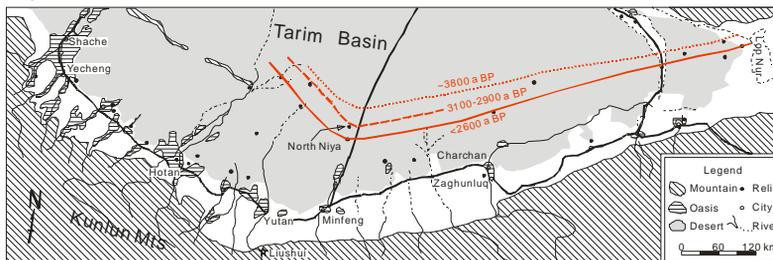


Fig. 1 Relics in southern Tarim Basin

The Tarim Basin is a hyperarid area with annual precipitation less than 50 mm and potential evaporation more than 3000 mm.

Prehistorical relics, prior to establishment of the Silk Road, from the southern Tarim basin mainly centered at three periods: before 3800 a BP, 3100-2900 a BP, and after 2600 a BP, showing apparent centurial gaps.

These gaps are patched by the newly-excavated relics (the Liushui cemetery, shown as ☆) from a Kunlun highland south of the basin, with cultural horizons spanning 3500-3300, 3000-2600 yr BP, and historical periods.

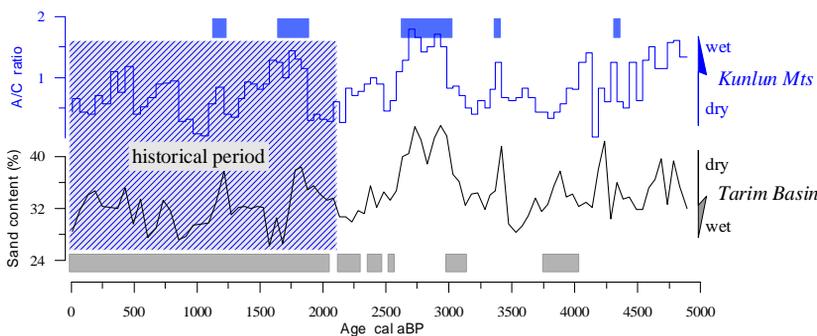


Fig. 2 Durations of relics in a climatic context

A loess section close to the Liushui cemetery registered environmental history during the last 5000 years. We apply *Artemisia*-Chenopodiaceae ratio of pollen (A/C ratio) to reconstruct moisture changes on Kunlun Mts, and bulk sand content as an aridity indicator of the Tarim Basin.

Placing relic durations in the climatic context reveals that prehistorical relics just occurred at the relatively wet periods, no matter on the Kunlun highlands or in the southern basin.

This pattern indicates clearly that the ancient people, like modern dwellers in hyperarid regions, are sensitive to water accessibility.

North Niya Site (ca. 3100-2900 aBP, Tarim Basin)



Liushui Cemetery (ca. 3000-2600 aBP, Kunlun Mts, 2750 m a.s.l.)



Zaghunluq (<2700 aBP, Tarim Basin)

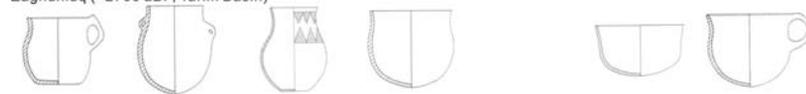


Fig. 3 Affinities & continuities of the relics

Typological comparison, as well as other lines of evidence, shows confirmative affinities between the three relics.

During succession of relics from both the basin and the highland, cultural complexities increased gradually, with no significant absences or collapses from 3300 aBP to the historical periods.

Concluding Remarks

- Redistributions of prehistorical people and relics in the hyperarid Tarim Basin are water-pressured. Moisture change is an important explanation for relic distributions in this region, although not the sole reason.
- Their culture can be succeeded and developed in natural shelters whilst the people migrated under the environmental pressure. In other words, environmental pressures have little influences on civilization evolution, even in fragile habitats and during prehistorical periods.
- More cautions needed to evaluate the influences of environmental change to civilization.

References

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