Geophysical Research Abstracts
Vol. 15, EGU2013-10688, 2013
EGU General Assembly 2013

Long term effects of Climate change on Human adaptation in Middle Gila River Valley

Tianduowa Zhu (1) and Maurits Ertsen (2)

(1) Delft University of Technology, Civer Engineering and Geosciences, Delft, Netherlands (t.zhu@tudelft.nl), (2) Delft University of Technology, Civer Engineering and Geosciences, Delft, Netherlands (M.W.Ertsen@tudelft.nl)

Climate change has been one of key concerning factors for the origin and evolution of hydraulic engineering projects. The study of ancient irrigation systems in the context of long-term climate change enables us to improve the understanding on the response of human beings to variations on their environment. And niche construction starts to be used to explain the development of early small-scale irrigation canals in a view of biological evolution. Therefore, the study of early irrigation canals within a frame of long-term timescale may help to explore the roles of niche construction theory on canals' operation and further expansion.

In this paper, the Hohokam canals in the middle Gila River of Southwest America are used as case study, in order to explore the influences of climate change on human behavior. A prehistoric large-scale irrigation network, the Hohokam irrigation system was composed of interconnected sections organized by local independent communities, rather than under the supervision of a central government. This common operation for water distribution without centralization provides us with the opportunity to focus on the relationship between humans and their environment. The aim of this paper is to model the process of human adaptation to their environment, including water flows, crops production and canal maintenance in long term, with the assistance of archaeological surveys and reconstructed climatological data.

The results provide us with an insight on how the variation of the configuration of the canals is clearly conditioned by the interaction and adaptation of human settlements. This evolution can be explained by the combination of human food needs to the restrictions of the changing climate given by water availability. The balance of human demand and water availability guides the direction of human dynamics.