MULTIDISCIPLINARY RESEARCH IN THE YILUO PROJECT: AFTER 10 YEARS

Li LIU[1] and Xingcan CHEN[2]

[1] Archaeology Program, La Trobe University, Vic 3083, Australia; [2]Institute of Archaeology, CASS, Beijing, China
Emails: L.Liu@latrobe.edu.au; chenxingcan@hotmail.com

The Yiluo project was launched 10 years ago, at the end of 1997. It is an international, multidisciplinary archaeological program focused on monitoring the processes which led to the rise of early states in the Yiluo basin of north China, a heartland of Chinese civilization. For the first four years our team primarily focused on an extensive study of settlement patterns in the valley, using regional full-coverage surveys and geoarchaeological investigations. The results from this program led to a greater understanding of the dynamic relationships between settlement patterns and social formations, from the early Neolithic to the Bronze Age (c. 6000-2000 BC). A number of publications have already come out that utilise the survey data in order to address issues regarding the developmental processes of complex society and political strategy in this formative period of Chinese civilization (Chen et al. 2003; Lee 2004; Liu and Chen 2003; Liu *et al.* 2002-2004). Our data clearly show that a centralized state (Erlitou) emerged in the Yiluo basin, as manifested by population nucleation and the settlement hierarchy.

In addition to settlement archaeology, we have also investigated many other topics, including palaeoenvironmental reconstruction, geoarchaeology, and the developments of craft specialisation, political economy and subsistence strategies. These studies have led to a series of publications, some accomplished in the form of Honours and postgraduate research theses. These include a geological study of lithic resources in the Songshan Mountains (Gorton 2003); an experimental study of the manufacture and use of stone spades (Owen 2006); and a series of archaeological studies of the production and distribution of stone tools at the site of Huizui (Ford 2001, 2004, 2007), the subsistence economy at community and regional levels (Bestel 2006; Lee et al. 2007), population and land use in the lower Yiluo River valley (Qiao 2003), the emergence of urbanism in the Yiluo region (Liu 2006), the production of elite ritual objects in early states (Liu 2003), and archaeological problems in the reconstruction of early dynastic history (Liu and Xu in press).

The assemblage of seven papers presented in this BIPPA issue demonstrates the most recent endeavours of the Yiluo project team, and some are developed from unpublished research theses. We have continued to explore the research questions set out at the beginning of the project, and have expanded the scope of investigations to ever broader areas. Rosen's paper provides a background on environmental change in relation to the emergence of early states in the study area, demonstrating that human responses to environmental change depended on social as well as environmental considerations. This promise is supported by Lee and Bestel's archaeobotanic study of plant remains from Huizui. When the climate became cooler and drier during late Longshan and Erlitou periods, more drought-resistant crops, such as wheat, were introduced into the Yiluo region, apparently as a response to the environmental changes. However, rice production also increased during the Erlitou period, a phenomenon that may be explained as due to a social-political decision to meet the growing demand for elite food. Qiao's GIS analysis of settlement data also shows a social response to stress, in that the development of a settlement hierarchy and possibly a food tribute system correlated with a general trend towards increasing population pressure and land shortage.

The production and distribution of craft items provide important information about political economy in the region. Our research has also focused on utilitarian stone tools and elite white pottery vessels. We have investigated the entire process of stone-tool production at the secondary regional centre of Huizui. Several papers contribute towards an understanding of the distribution of lithic outcrops in the Songshan Mountains and raw material procurement (Webb *et al.*), procedures for tool manufacture (Owen), and modes of production and the distribution of finished products (Liu *et al.*). Trace-element analysis of white pottery from several Erlitou sites also shed lights on the production and distribution of these prestige ritual objects. The results of these studies show that dynamic interactions between the primary urban centre of Erlitou and its hinterland, as well as between the regional centres, constituted crucial social, economic and political relations, both hierarchical and heterarchical in nature, during the process of state formation in the Yiluo region.

Macphail and Crowther's soil micromorphological and chemical analyses of house floors and ash pits provides punctuated insights into the occupational and landscape history of the Huizui site. Together with the other studies of Huizui data, we have begun to learn much about lifeways of this ancient village.

As the project is on-going, these studies are still preliminary. Our future research will certainly produce more elaborate and multi-faceted results for a better understanding of the development of complex society in the Yiluo region.

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