# Path Toward Civilization: Natural Roads and the Location of Economic Activities in Pre-historical China (7000 BP – 2000 BP)

Ruoran Cheng

February 2024

**Abstract**

The rise of cities marks a key step in human civilization. Roads link cities, turning them into centers for spreading information, goods, and technology. Studying how cities and roads are spatially placed in relation to each other throughout history shows us how societies have interacted and evolved. However, the scarcity of information on urban sites from periods before recorded history complicates efforts to incorporate the uneven spatial distribution of economic activities into a long-term perspective. Advances in Chinese archaeology offer new avenues for such spatial analyses. This study assesses natural roads in China and constructs a database that includes all archaeological settlements with fieldwork. Here we show that the relationship between the location of cities and natural routes has changed over time. We find that since human settled down, economic activities have generally concentrated around regions with convenient natural road access. However, approximately 4,500 years ago, this relationship declined significantly and remained low for nearly a millennium, only reversing with the emergence of the first territorial state. This turning point coincided with a major global climatic event (Holocene Event 3), potentially suggesting a climate shock triggered Malthusian trap, followed by prolonged conflicts resolved by the formation of a unified state, as proposed in the circumscription hypothesis. Finally, around 2,000 years ago, after the establishment of China's first unified empire, the correlation changed significantly, highlighting the influence of institutions on urban hierarchy. We anticipate that our findings will provide a new foothold for further interdisciplinary studies on the evolution of human civilization and distribution of cities.