

Advances for Earth's Critical Zone Research in Jianghan Plain, central China

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Introduction

Critical Zone (CZ) science is one of the hottest research fields in earth sciences. International researchers mainly promote the development of CZ science through Critical Zone Observatory (CZO), which serves for economic development and ecological protection. In China, CZ studies are still in the initial stage. Jianghan Plain is not only an important part of the Yangtze River economic zone, but also one of the areas most seriously affected by large water conservancy projects in China. On the basis of several years of CZ survey, we have established a systematic monitoring network in Jianghan Plain, covering various elements of the CZ, especially water, biology and greenhouse gas. In the design of monitoring network, we not only considered the influence of water conservancy projects, but also the occurrence characteristics of nutrient elements and heavy metals. In the near future, more efforts will be made to make more online monitoring data and integrate systematic accomplishments. Base on the systematic monitoring of CZ, the final objective is to enrich the theory and method of investigation and research on Earth's Critical Zone in China and provide a strong theoretical and methodological support for Great Protection of the Yangtze River.

Design and construction of Critical Zone Exploration Network (CZEN)

Jianghan Plain is densely distributed with water conservancy projects of different sizes. Human activities such as water diversion, water retention and drainage have significantly affected original distribution of water resources in Jianghan Plain. This will greatly change the hydrological cycle in the CZ of Jianghan Plain, and further affect the material circulation process and ecological effect. Therefore, we divided the Jianghan Plain CZO into three scales according to the influence of different water conservancy projects(Fig.1): basin scale, lower Han River valley scale, and small watershed scale.

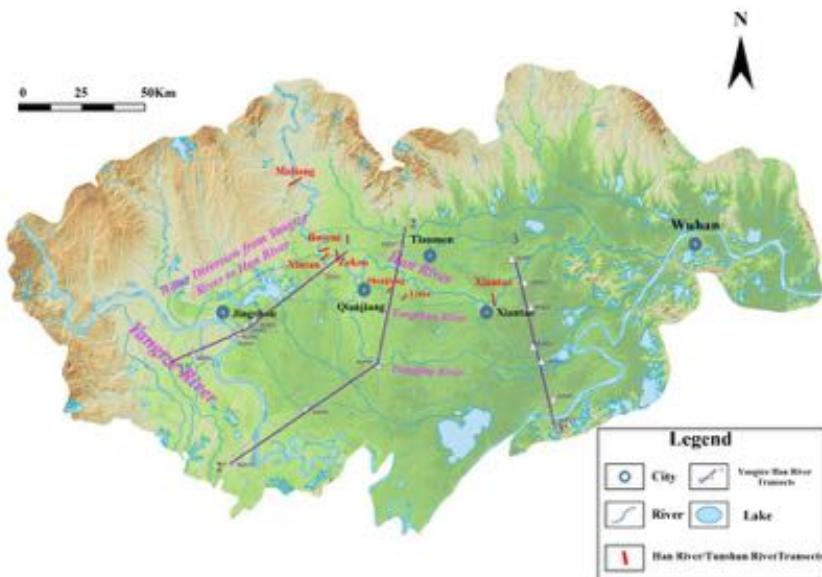


Figure 1. The deployment diagram of Jianghan Plain CZO. Note the white triangles represent the monitoring hole of Yangtze-Han River Transects(1-1 ', 2-2 ', 3-3 '), which are indicated by three purple lines; Red line shows small transects along the bank of Han River or Tunshun River.