

# **The Key Engineering Geological Problems of the Site Selection of Five-hundred-meter Aperture Spherical Telescope (China's Eye of Heaven) in Guizhou Province**

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On September 25, 2016, the five-hundred-meter Aperture Spherical Telescope (FAST), honoured as "China's Eye of Heaven", was formally operated in DaWoDang depression of KeDu town, PingTang county, Guizhou province, which was the most recommended position of Prof. Song's scientific research team. How to find the most perfect "eye socket" — DaWoDang depression — as the site from numerous karst depression in Guizhou province was a vital scientific challenge in the construction of FAST project. Combining with the following issues: sites conditions, placement requirements and the key scientific problems needed to be solved during the site selection process, this report systematically expounds the theory & method of site selection of large spherical telescope (FAST/SKA) in karst region, Guizhou province. The first part mainly expatiates the geological background, the characteristics of the new tectonic movement, the seismicity and the risk of earthquake, the characteristics of the tectonic stress field and the division of the tectonic region stability; The second part focuses on the regularities of distribution of karst and peak-cluster depression area in Guizhou province, the 3D simulation and optimization design system of the station location, the site evaluation and optimization theory of five-hundred-meter aperture spherical telescope (FAST), the site layout and the realization method of the square kilometre array (SKA); The third part preliminarily discusses the following key engineering geological problems of the core site — DaWoDang depression: the regional, geological and environmental conditions, the seismic and dynamic response characteristics, the stability evaluation theory of rock slope, karst collapse and the stability of its roof, etc.