



## **The use of the A10-022 absolute gravimeter to construct the the gravity basic network in Guangxi, China**

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The China National Gravity Basic Networks (CNGBN) are fundamental projects for gravity surveying and mapping in China. An important goal of the networks is to provide a reference for gravity surveys and supply the scale to the baselines. However, the gravity base points and baselines from the 1985 and 2000 CNGBN are few and scattered, and have been destroyed to varying degree for Guangxi region. Thus, it is necessary to construct a new gravity basic network to meet the demand of the present work in Guangxi.

The A10 (Micro-g LaCoste Inc.) designed as a portable free-fall absolute gravimeter is well suited to directly measuring the gravitational acceleration ( $g$ ) in the field. The A10 has already been used for more than a decade, and previous studies have been reported on its accuracy and repeatability not only compared with FG5 in indoor, but also the differences between the A10 and the relative gravity differences measured by CG-5 in the baseline field of outdoor conditions.

In this study, the A10-022 gravimeter firstly attended the 10th International Comparison of Absolute Gravimeter (ICAG-2017) in Beijing, and Rubidium oscillator and laser frequency parameters are calibrated in the meantime. A good comparison result and the newest metrological parameters is the premise of the accuracy of instrument measurement results. Then, we used A10-022 to rebuilt the gravity basic network in Guangxi, including forty-two gravity basis points and two relatively gravimeter calibration fields (i.e. baselines) during November to December in 2017. In addition, basing on the field measured data and historical observation data in the laboratory, we also analyzed the influence of the absolute gravity observation precision between the measurement environment and the metrological parameters changes in detail. Different measuring conditions and parameter settings, measurement veracity of the absolute gravity values could be different.

This work demonstrates the capabilities of the A10 both in the laboratory and in the field. The establishment of the gravity basic network can provide a high precision infrastructure for the applications such as gravity exploration and surveying and mapping, earthquake prediction in Guangxi and surrounding areas.