



Gravity above massive rectangular piers: measurements, reduction and modelling

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We performed a 3D microgravity survey of three indoor concrete piers with relative gravimeters. The three Scintrex CG-5 were used for this task. The measurements were performed according to a pre-planned schedule on four height levels over nine points above piers, which also were connected with each other over benchmarks. In all, more than 250 ties were carried out about a month. The measurements were adjusted with a robust algorithm. The geocentric coordinates of the corners of the piers have also been measured for reductions. We compared the unreduced and reduced adjusted results with a simple gravitational attraction of a rectangular prism. We also analyzed the uncertainty caused by displacement from a benchmark of the absolute and, more importantly, relative gravimeters on massive pillars. The main result, however, is a high-precision 3D empirical model of the three connected piers, which can be used to transfer gravity value to any instrument with any reasonable reference height and any reasonable displacement from a benchmark.