CAN EPISODIC REPEAT GPS OBSERVATIONS DETECT SMALL-MAGNITUDE VERTICAL LAND MOTION?

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Project Description:
Time-series from continuous GPS (CGPS) stations are able to detect small-magnitude vertical land motion (VLM) following rigorous processing and analysis. However, CGPS stations are not always available, and are costly (~$70k) to install. Repeat episodic GPS observations have been attempted to identify VLM, but are often not able to determine VLM to the required precision. This project will test whether multiple repeat GPS observations can detect small-magnitude VLM, which can then avoid the need to install additional costly CGPS stations. The project will use the east-west repeat levelling line established for the Perth subsidence project, with the repeat first-order levelling (observed twice a year) to be used as ground truth for the repeat GPS. A set of selected benchmarks will be observed for periods of up to 12 hours (but >6 hours) at one month intervals over 12 months. Additional testing will be conducted through episodic GPS observations taken adjacent to existing CGPS stations at Hillarys and Gnangara. These observations would be processed in Bernese software and the time-series computed using CATS (Williams 2008). The resultant VLM time-series can be verified against the VLM determined from the first-order levelling and also with TerraSAR-X (InSAR) derived velocities along this profile.