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Long-term monitoring with spring-based gravimeters: tilt-control benefits and application to the Rochefort Cave Laboratory (Belgium)

Benjamin Fores[1], Arnaud Watlet[2,3], Michel Van Camp[2], and Olivier Francis[1]
[1]University of Luxembourg (benjamin.fores@uni.lu)
[2]Royal Observatory of Belgium
[3]British Geological Survey

Spring-based gravimeters are light and easy to install, with a precision around 5 µGal/√Hz. However, they are still not used for long-term gravity monitoring. The main reason for that is the non-linear drift of those instruments, which is very difficult to correct without removing geophysical signals. We will show that when the tilt is actively controlled, a gPhone spring-based gravimeter shows a quasi-linear drift and can reach a long-term stability at the µGal level.

This allows experiments such as the one in the Rochefort Cave Laboratory (Belgium). Thanks to the size of the gPhone and its low facility requirements, a monitoring from inside a cave was possible. Coupled with another gravity monitoring at the surface, it reveals new information on the local hydrology of this karstic site.

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