Geophysical Research Abstracts
Vol. 18, EGU2016-14168, 2016
EGU General Assembly 2016


# Continuous absolute g monitoring of the mobile LNE-SYRTE Cold Atom Gravimeter - a new tool to calibrate superconducting gravimeters -

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Atom interferometry allows for the realization of a new generation of instruments for inertial sensing based on laser cooled atoms. We have developed an absolute gravimeter (CAG) based on this technic, which can perform continuous gravity measurements at a high cycling rate. This instrument, operating since summer 2009, is the new metrological french standard for gravimetry.
The CAG has been designed to be movable, so as to participate to international comparisons and on field measurements. It took part to several comparisons since ICAG'09 and operated in both urban environments and low noise underground facilities.
The atom gravimeter operates with a high cycling rate of 3 Hz. Its sensitivity is predominantly limited by ground vibration noise which is rejected thanks to isolation platforms and correlation with other sensors, such as broadband accelerometers or sismometers. These developments allow us to perform continuous gravity measurements, no matter what the sismic conditions are and even in the worst cases such as during earthquakes. At best, a sensitivity of 5.6 $\mu$Gal at 1 s measurement time has been demonstrated. The long term stability averages down to 0.1 $\mu$Gal for long term measurements. Presently, the measurement accuracy is 4 $\mu$Gal, which we plan to reduce to 1 $\mu$Gal or below.
I will present the instrument, the principle of the gravity acceleration measurement and its performances. I will focus on continuous gravity measurements performed over several years and compared with our superconducting gravimeter iGrav signal. This comparison allows us to calibrate the iGrav scale factor and follow its evolution. Especially, we demonstrate that, thanks to the CAG very high cycling rate, a single day gravity measurement allows to calibrate the iGrav scaling factor with a relative uncertainty as good as 4.10-4.