

# Superconducting Gravimeter Data from Walferdange - Level 1

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The International Geodynamics and Earth Tide Service (IGETS) was established in 2015 by the International Association of Geodesy (IAG). IGETS continues the activities of the Global Geodynamics Project (GGP, 1997-2015) to provide support to geodetic and geophysical research activities using superconducting gravimeter (SG) data within the context of an international network.

The Walferdange Underground Laboratory for Geodynamics (WULG) is located at the middle of a long labyrinth of galleries which originally have been established for the commercial extraction of gypsum. Exceptional temperature and humidity stability, the absence of water and human perturbations, distance from the ocean and easy access, were some of the motivations for initially choosing this site for instrumentation and Earth tide research. Instruments to measure the micro-deformations produced by the tidal forces have been developed and tested in the Laboratory for more than 30 years. Ground deformations and earthquakes are or have been recorded continuously by means of spring gravimeters, vertical and horizontal pendulums, long base water-tube tiltmeters, vertical and horizontal strain meters, short period and broad band seismometers. Meteorological parameters (temperature, humidity and atmospheric pressure), as well as radon gas emissions, are also continuously monitored in various locations within the mine.

In 2000, the Minister of Research of the Grand-Duchy of Luxembourg decided to establish a new International Reference Station for Intercomparisons of Absolute Gravimeters (ISIAG). The instrumentation to support the project includes a superconducting gravimeter OSG-CT040, an absolute gravimeter FG5X-216, and other ancillary equipment necessary to support research. In January 2002, a first superconducting gravimeter was installed. The instrument was then stopped in March 2003 due to an abnormally large instrumental drift. In December 2003, it was replaced by a brand-new gravimeter with the same name, and which continuously operates since that date. Absolute gravity measurements have been performed on a regular time base to calibrate the superconducting gravimeter and to estimate its instrumental drift.

Since 2003, the WULG hosted three European Comparisons and one International Comparison of Absolute Gravimeters. It was the first international comparison outside the walls of the BIPM (Bureau International des Poids et Mesures) in Sèvres (France) where it had traditionally been organized for 30 years.