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Reference Gravity in the Minas Gerais state – Brazil

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This poster presents the **22 Gravity References undertaken with the A10 gravimeter**, number 32, in the state of Minas Gerais, Brazil. These stations will be part of the **International Gravity Reference Frame (IGRF)**, representing the highest-level stations to the gravity surveys. The project, financed by CNPq, was executed by CENEGEO along with UFU, and in cooperation with LTG-USP, and *Instituto Geográfico e Cartográfico do Estado de São Paulo* (IGC).

TECHNICAL FEATURES:

1. GNSS observations, with **double frequency receivers**, allowed the establishment of precise coordinates for the absolute observations sites. The **local gradient**, used to reduce the absolute gravity value to the benchmark, has been determined using a relative **CG5 gravimeter**.
2. The **station locations** were chosen according to an average distance of **100 km** between the points and, as much as possible, coincident with the **Brazilian Network for Continuous Monitoring of the GNSS** (*Rede Brasileira de Monitoramento Contínuo dos Sistemas GNSS* - RBMC) availability.
3. The **measurement site** was selected based on their **long-lasting characteristic** with easy access and as far as possible from noise. On the other hand, attention has been addressed to perform the **measurements over relative gravity reference** stations, like *Rede Gravimétrica Fundamental do Brasil* (RGFB), to check results and bias. By connecting relative networks to a station of IGRF, it is possible **to readjust those networks** by using reliable absolute gravity as injunction.

FUTURE STEPS:

the **improvement of the height system infrastructure of Minas Gerais**, the calculation of **geoid/quasigeoid model** and the establishment of four **IHRF** stations expected for Uberlândia, Montes Claros, Varginha, and Governador Valadares, whose absolute gravity measurement was already performed in this project.

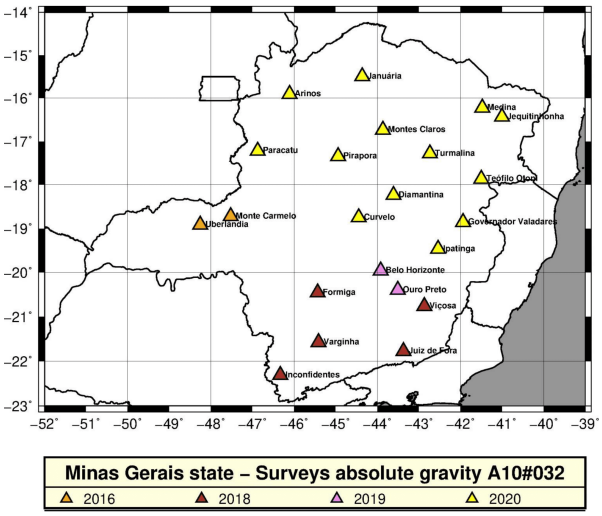

Figure 1 - Reference gravity station and its epoch of determination.

Gravity data information for download is available in Portuguese (see: https://www.cenegeo.com.br/rede-grav-absoluta/rede-absoluta-sao-paulo) and in English (see: http://agrav.bkg.bund.de/agrav-meta/).

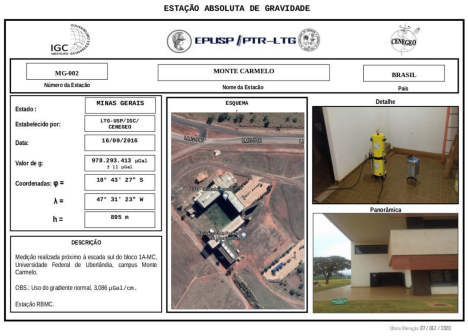

Table 1 - Gravity values and standard deviation.

STATION	G absolute (μGal)	STATION	G absolute (μGal)
Arinos	978,224,173 ±11	Medina	978,249,703 ±11
Belo Horizonte	978,324,674 ±11	Monte Carmelo	978,293,413 ± 11
Curvelo	978,353,923 ±11	Montes Claros	978,237,919 ±13
Diamantina	978,216,701 ±13	Ouro Preto	978,335,893 ±11
Formiga	978,383,796 ±11	Paracatu	978,250,948 ±12
Governador Valadares	978,458,079 ±11	Pirapora	978,300,610 ±11
Inconfidentes	978,516,864 ±11	Teófilo Otoni	978,392,486 ±11
Ipatinga	978,445,183 ±12	Turmalina	978,246,173 ±11
Januária	978,251,100 ±11	Uberlândia	978,293,640 ± 11
Jequitinhonha	978,347,760 ±11	Varginha	978,472,063 ±11
Juiz de Fora	978,505,542 ±11	Viçosa	978,460,357 ±11