

Absolute gravity measurements at the iGrav047 site on Helgoland (GFZ Potsdam, AWI facility) with the Hannover gravity meter FG5X-220 in June 2021

Ludger Timmen, 19th July, 2021

Institut für Erdmessung (IfE), Leibniz Universität Hannover, Schneiderberg 50, 30167 Hannover, Germany
timmen@ife.uni-hannover.de

Table 1. Coordinates of the absolute gravity site occupied by the Hannover FG5X-220 in 2021

Station	φ [deg]	λ [deg]	H [m NHN]	Description
Helgoland AWI	54.1779	7.8917	2.0	station in the basement of AWI

Table 2: Absolute gravity values of the FG5X-220 measurements. The gradient insensitive sensor height depends on the gravimeter setup and is here ~ 1.26 m above floor level. The reference height $h=1.250$ m (above floor point) has been chosen for comparison reasons in the future. The vertical gradient of $-2.880 \mu\text{m/s}^2$ per m has been measured on 24 June 2021 (Δg measurement between sensor heights 0.239 and 1.345 m above floor, std. $0.004 \mu\text{m/s}^2$).

Site	Measurement run (orientation)	Date in 2020	Drops	$\delta g/\delta h$ [$\mu\text{m/s}^2 / \text{m}$]	$g_{h=1.250}$ [$\mu\text{m/s}^2$]
Helgoland					
Run 1/setup1	20210622 (S)	23 June	1954	-2.880	9814054.332
Run 2/setup1	20210623a (S)	23 June	1228	-2.880	9814054.367
Run 3/setup1	20200623b (S)	23/24 June	7083	-2.880	9814054.350
Mean (setup 1)			10265		9814054.349
Run 4/setup2	20200624 (W)	24/25 June	6358	-2.880	9814054.321
Run 4/setup2	20200625 (W)	25/26 June	4975	-2.880	9814054.331
Mean (setup 2)			11333		9814054.325
Average	(arithm. mean of setups)		21598		9814054.337

The mean g-value of the setups are averages weighted by the no. of drops. The total average is the arithmetic mean of the two mean values of the setups.

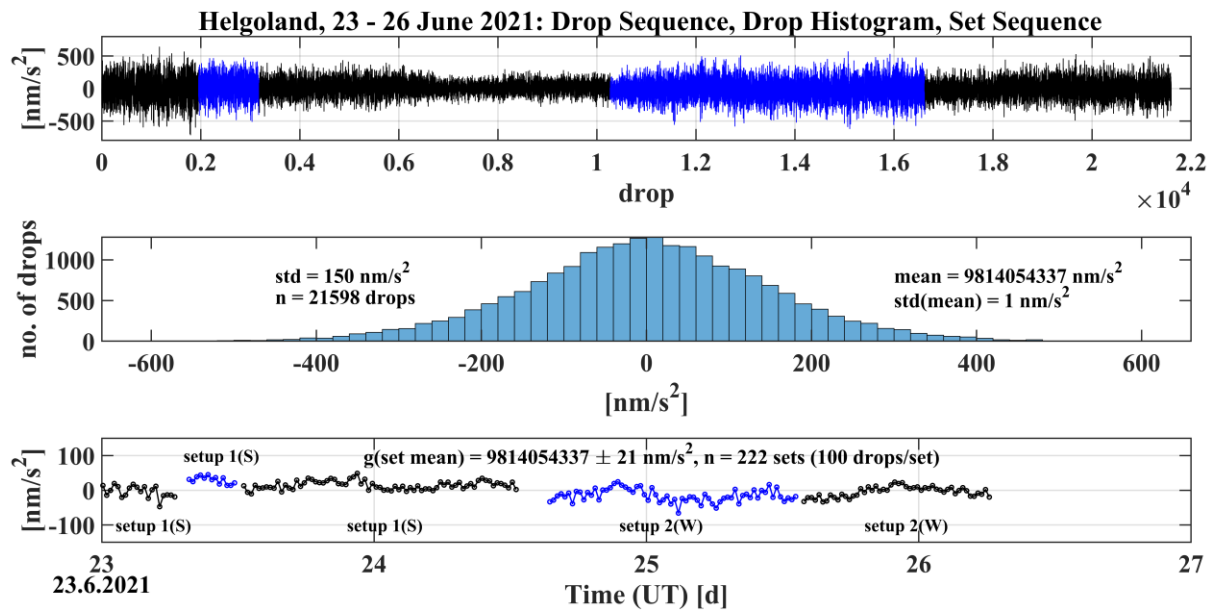


Figure 1: Statistical compilation of the station determination with the Hannover FG5X absolute gravimeter on Helgoland in June 2021