New Zealand A10 measurements 2011

Technical note, February 2012

J. Emil Nielsen
jemni@space.dtu.dk
DTU Space, Geodynamics

Land Information New Zealand
Toitū te whenua

DTU

Absolute gravity in New Zealand 2011

In connection with the return of the Danish A10-019 absolute gravimeter from a campaign in Antarctica were two sites visited in New Zealand. The measurements were done by DTU (Technical University of Denmark, contact: Emil Nielsen) in cooperation with LINZ (contact: Matt Amos). The instrument used was the A10 manufactured by Micro-g LaCoste. The accuracy of this instrument is 10μGal and the repeatability is 10μGal.

The measurements were done in the days of December 14th and 15th. The two sites visited were Godley Head near Christchurch and at the observatory on Mt. John near Tekapo.

All values are given in the A10-019 measurement height (0.781 meters) and at ground level. The gradient at Godley Head was in 2009 measured by Yves Rogister and Nicolas Le Moigne from the University of Strasbourg. When transferring the value to ground level is this value used. For the site on Mt. John is the gradient measured by Roger Bilham in 2000 used.

The instrument was at both sites setup in the afternoon and was left running during the night until the next morning. This resulted in a 15,5 hours occupation at Godley Head and a 14,5 hours occupation at Mt. John. During this time was 62 sets containing 100 drops collected at Godley Head while it amounted to 58 sets containing 100 drops at Mt. John.

When returning to the instrument at Godley Head after the 15,5 hours occupation the drop scatter was found high and an extra measurement was made here. It was a short, 40 minute, measurement of 8 sets containing 100 drops. The final value presented here is the weighted mean of the two.

The site at Godley Head was measured in 2011 by the group form Strasbourg mentioned earlier with the FG5-206.

The difference between the FG5 and A10 measurements at ground level are (FG5 – A10):

Godley Head:	-8 μGal
Mt. John:	6 μGal

Godley Head

Lat: -43.588 **Long:** 172.804 **Height a.s.l:** 125.00 m.

Date: 2011/12/14 & 2011/12/15

Gradient: -3.548 µGal/cm

Measurement @ 0.718m.:

GH_20111214a, 62 sets, 100 drops: 980 489 251 +/- 12 µGal
GH_20111215a, 8 sets, 100 drops: 980 489 258 +/- 11 µGal

Mean gravity @ 0.0m.: 980 489 506 +/- 12 µGal

Mt. John Observatory

Lat: -43.986 **Long:** 170.464 **Height a.s.l:** 1032.00 m.

Date: 2011/12/15

Gradient: -3.910 µGal/cm

Measurement @ 0.718m.:
MJ_20111215a, 58 sets, 100 drops: 980 248 660 +/- 11 µGal

Mean gravity @ 0.0m.: 980 248 941 +/- 11 µGal