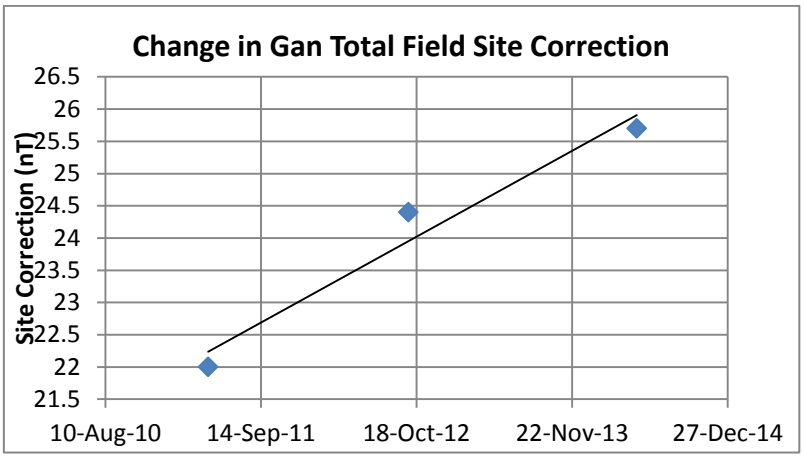
Check on Total Field Site difference at Gan 7 May 2014

During the week of 5 – 9 May 2014 the observatory at Gan was visited by Prof Andrew Jackson and Friedman Samrock to carry out routine maintenance. On 7th May measurements were made to determine any change in the Total Field site difference between the observatory proton and a proton mounted on the pillar at the D/I observing position.

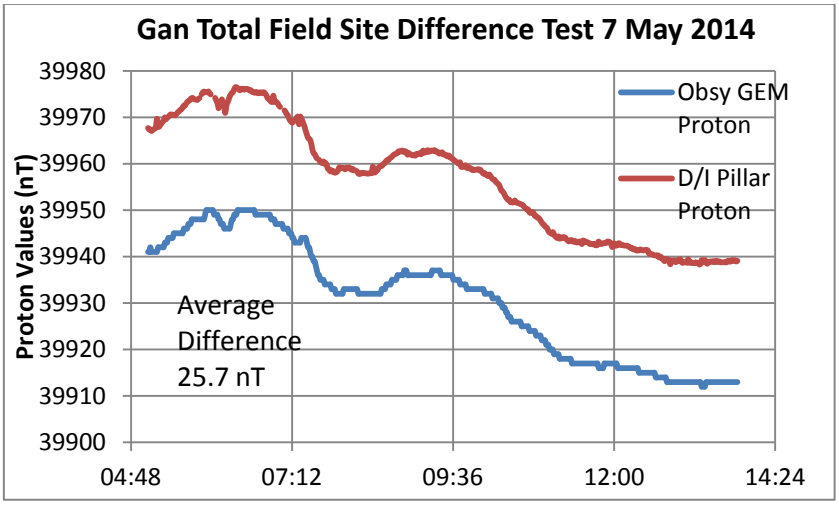
The result of this test indicated that the current difference between the two positions was 25.7 nT a change of 1.3 nT since it was last measured in September 2012.

Gan Site differences since the observatory was installed in 2011

Date	F Site Difference (nT)
01-May-11	22
27-Sep-12	24.4
07-May-14	25.7



Plot showing the change in the site correction since the observatory was installed in May 2011



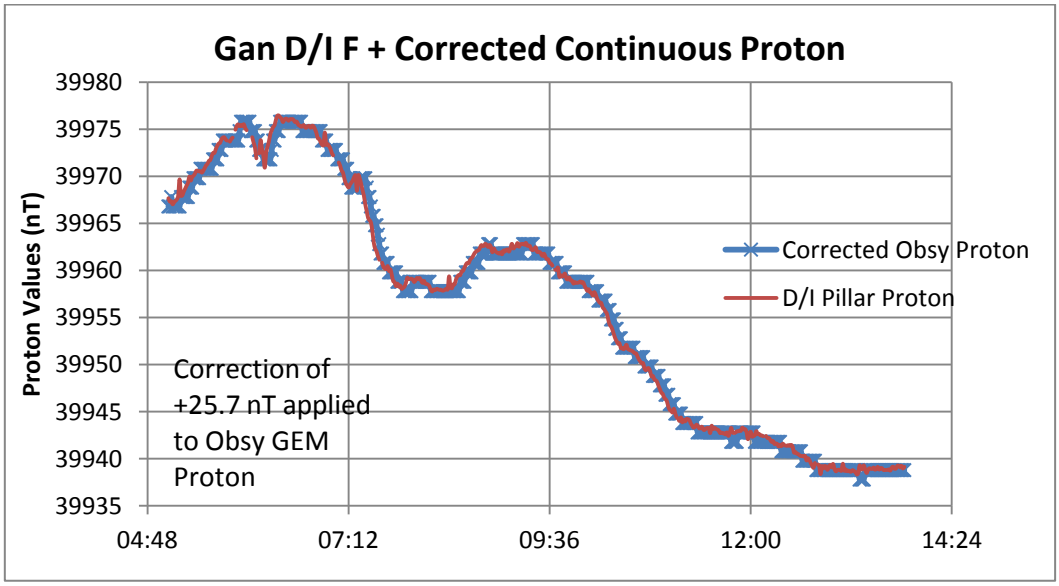
Results of a proton magnetometer set up on the D/I pillar and the observatory GEM Proton.

The test to check the site difference was run for 9 hours from 05:03 to 13:50 UT on 7 May with the proton on the D/I pillar set up on a support 32.5 cm above the top of the pillar and sampling every 30 seconds.

Photograph showing the proton bottle on a support 32.5 cm above the pillar.

In carrying out these measurements problems were experience with the proton magnetometer if it was placed any lower than 32.5 cm above the pillar.

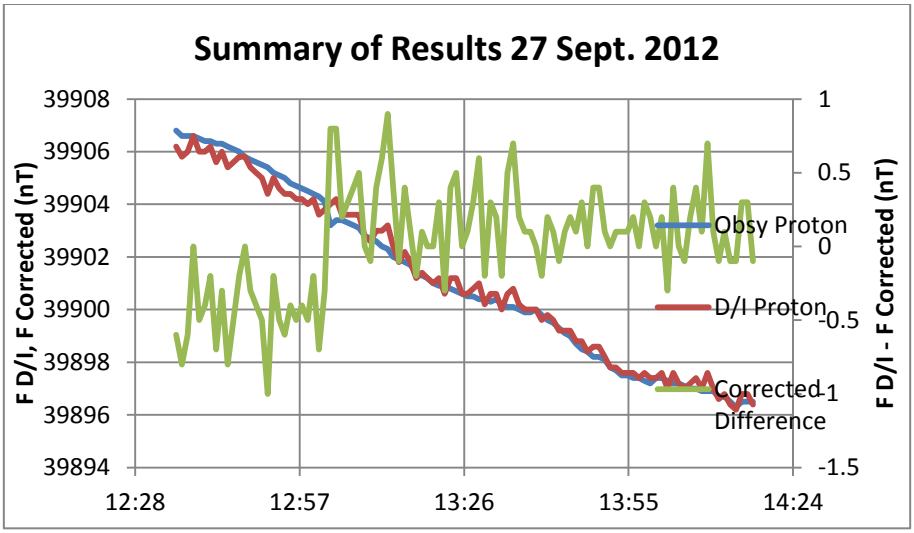
Below is a plot showing total field (F) measured at the D/I pillar and F measured by the observatory proton with a 25.7 nT correction added to the Observatory proton measured value.

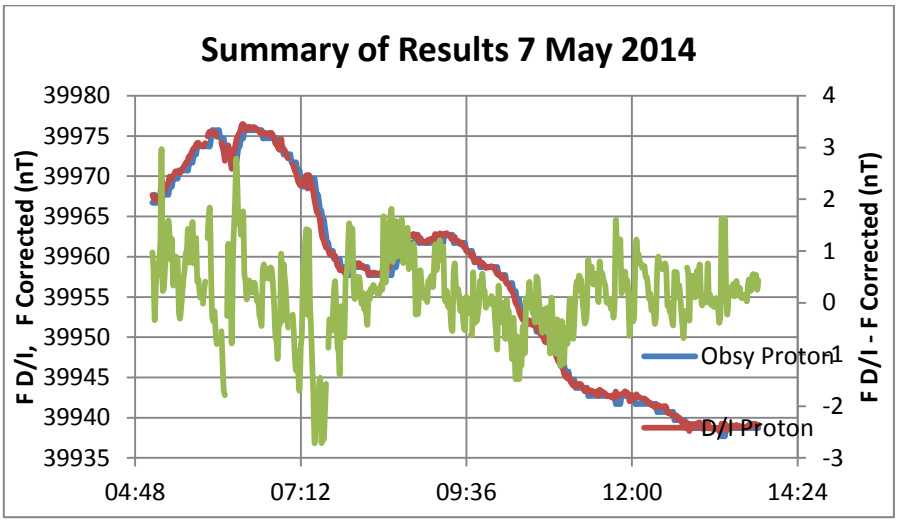


Results from these tests indicate an annual increase of +1.2nT/year in difference between F measured at the D/I position and F measured by the observatory proton.

Comparison of results of site difference measurements – September 2012, May 2014

Shown below are the results of the Total Field difference tests carried out in September 2012 and May 2014





The length of the 2012 data set is 1 hour 56 minutes and the 2014 data set covered a period of 9 hours 36 minutes.

The range of the F D/I – F Corrected (green trace) results lie within +/- 1 nT of zero for September 27 September 2012 and +/-2 nT for May 2014. Apart from a short period from 07:12 to 07:30 for the May data the scatter in the difference in both sets is in reasonable agreement, lying between +/- 1 to 1.5 nT of zero.

Possibly there is an increase in noise, due to magnetic gradients in the results of the 2014 tests. But this is not conclusive as these tests were made using a different magnetometer and covered a much longer sampling period. In both sets of results the noise from 12:00 to 14:30 is similar, around +/- 1nT and possibly the increase scatter in the May results measured from 05:00 to 08:00 is due to external site cultural noise.

Notes on F site Measurements.

May 2011 – Details of these measurements are not complete but the magnetometer was placed on a “hat” which was estimated to place the bottle 7 cm above the top of the pillar.

These measurements were made using an overhauser proton magnetometer and no problems in making these measurements were reported.

September 2012 – The measurements were made using a Geometrics G856 proton magnetometer (Serial Number 277366) with the bottle 26.5 cm above the pillar.

May 2014 – these measurements were made using the Gan proton magnetometer (GSM19T - Serial Number 3126263). In making these measurements problems were experienced when the magnetometer was placed near the top of the pillar. The optimum position for the bottle was 32.5 cm above the top of the pillar. It is possible that the metal disk mounted on the top of the pillar caused these problems.