

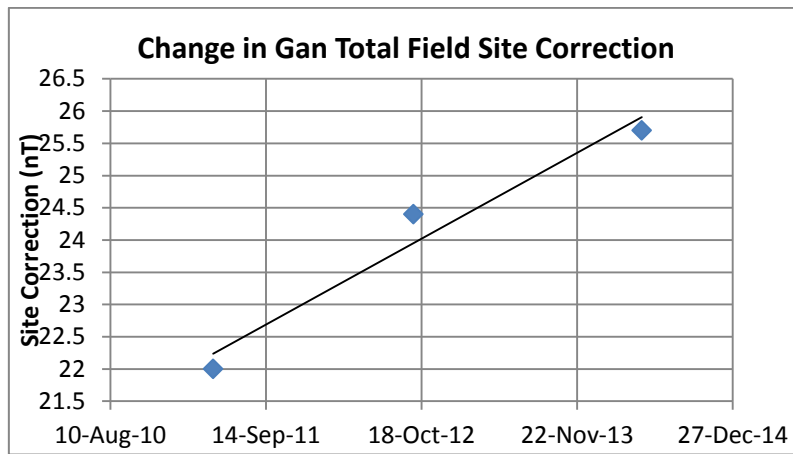
## Gan Total Field Site Difference - 2014

During the week of 5 – 9 May 2014 the observatory at Gan was visited by Prof Andrew Jackson and Friedmann 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.

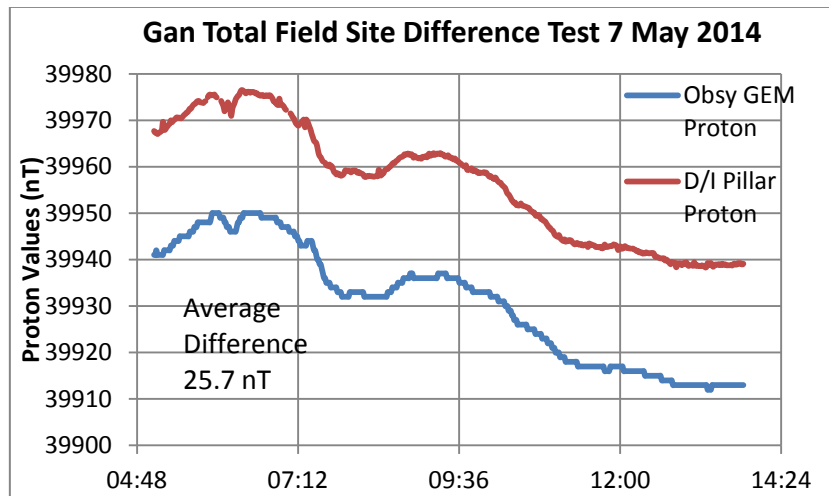
The result of this test indicated that the current difference between the two positions was 25.7 nT a change of 1.3 nT since it was last measured in September 2012.

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.

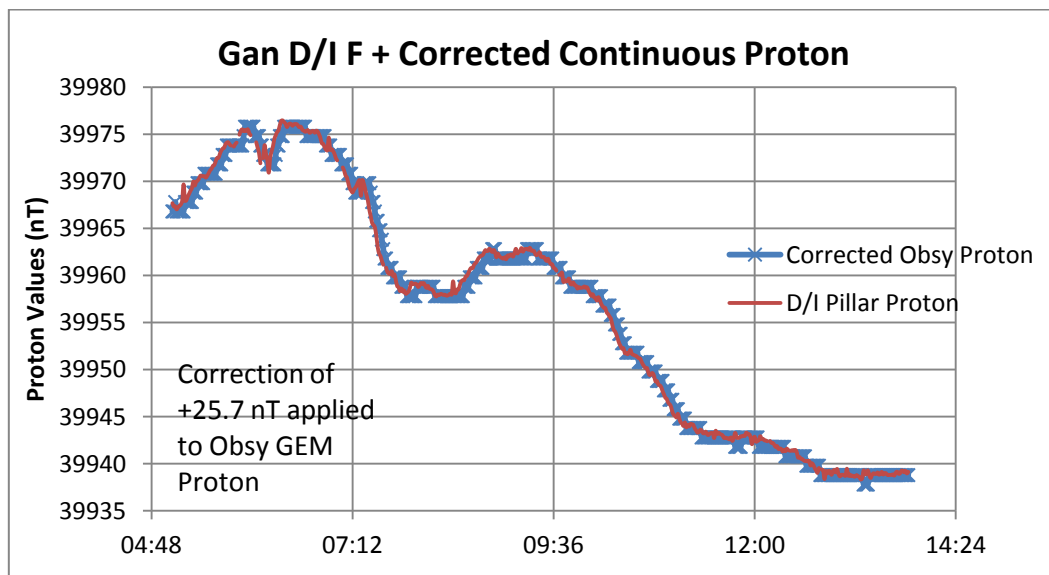
The test to check the site difference was run for 9 hours from 05:03 to 13:50 UT on 7 May with the proton on the D/I pillar set up on a support 35 cm above the top of the pillar and sampling every 30 seconds.



Photograph showing the proton bottle on a support 35 cm above the pillar.

In carrying out these measurements problems were experienced with the proton magnetometer detecting strong magnetic gradients if it was placed any lower than 35 cm above the pillar.

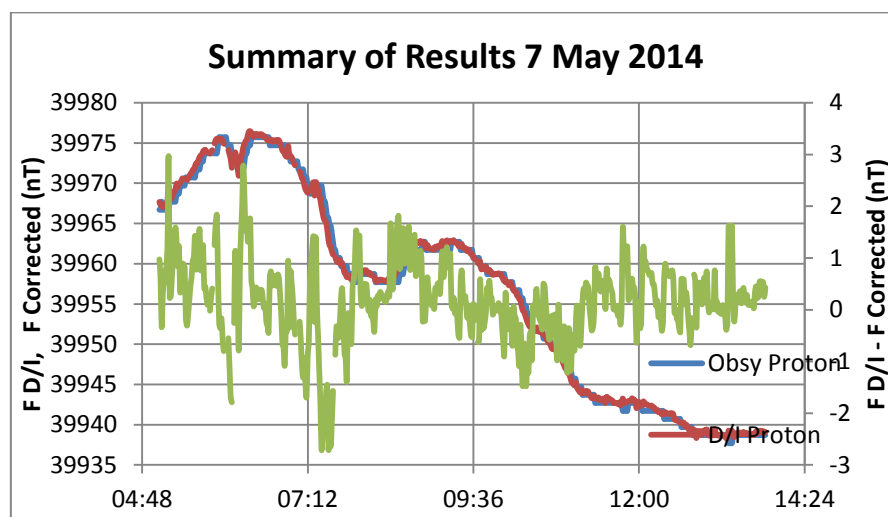
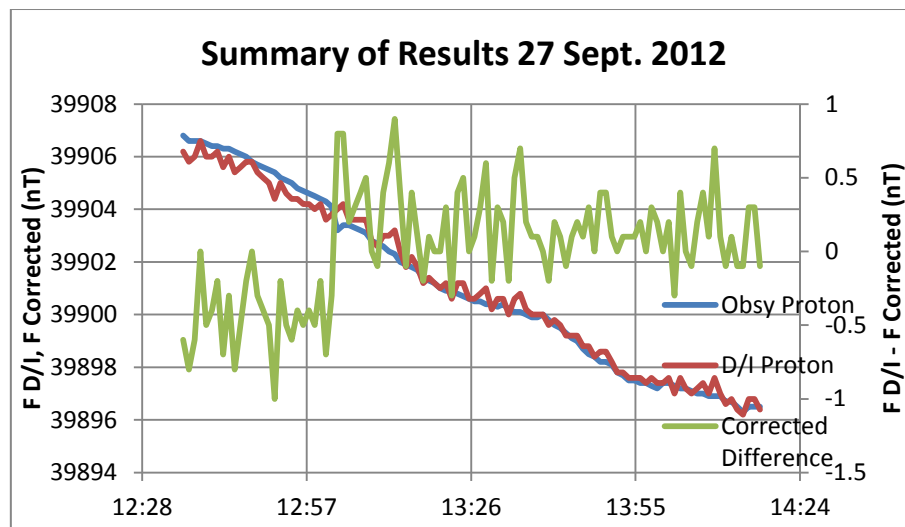
Below is a plot showing total field (F) measured at the D/I pillar and F measured by the observatory proton with a 25.7 nT correction added to the Observatory proton measured value.



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  $\pm 1$  nT of zero for September 27 September 2012 and  $\pm 2$  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  $\pm 1$  to 1.5 nT of zero.

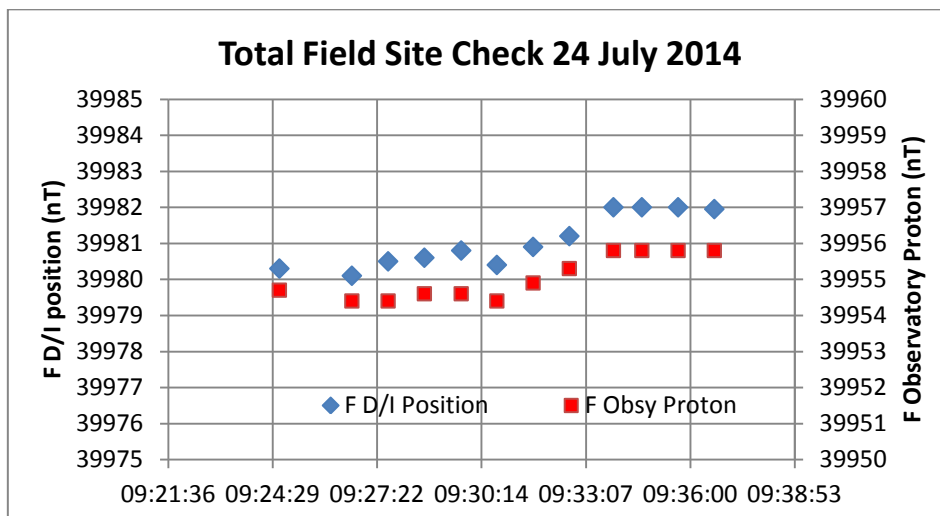
Possibly there is an increase in noise, due to magnetic gradients in the results of the 2014 tests. But this is not conclusive as these tests were made using a different magnetometer and covered a much longer sampling period. In both sets of results the noise from 12:00 to 14:30 is similar, around  $\pm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

**24 July 2014**

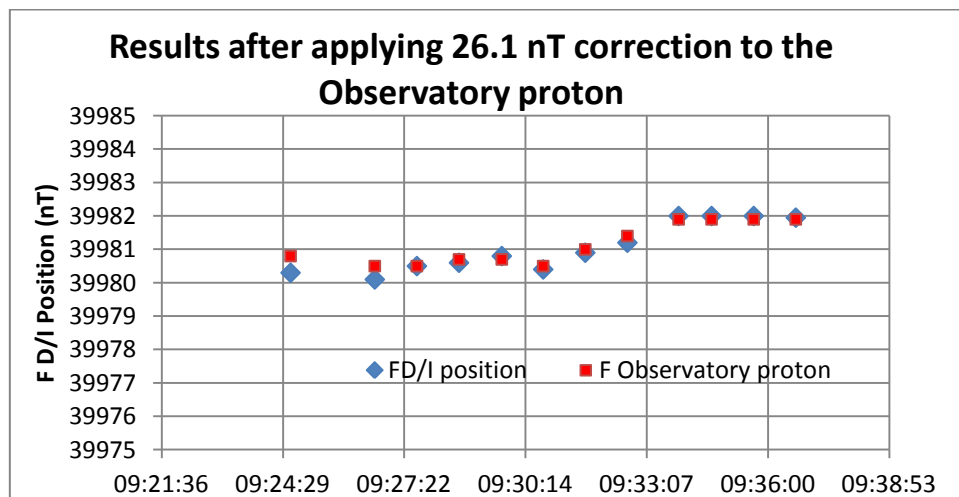
Between 0924 and 0936 a series of 12 measurements were made to check the total field (F) difference between the D/I Observing Pillar and that obtained from the continuous proton.

The results obtained from these measurements indicated an increase in the site difference of 0.4nT from the measurements made in May 2014.

Date	F Difference
01-May-11	22.0
27-Sep-12	24.4
07-May-14	25.7
24-Jul-14	26.1



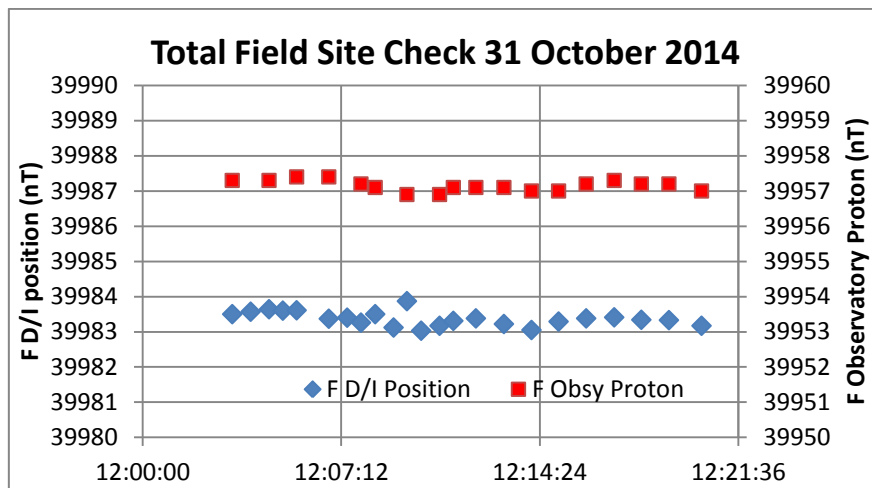
Plot of Total Field measured at D/I position and Observatory Proton position



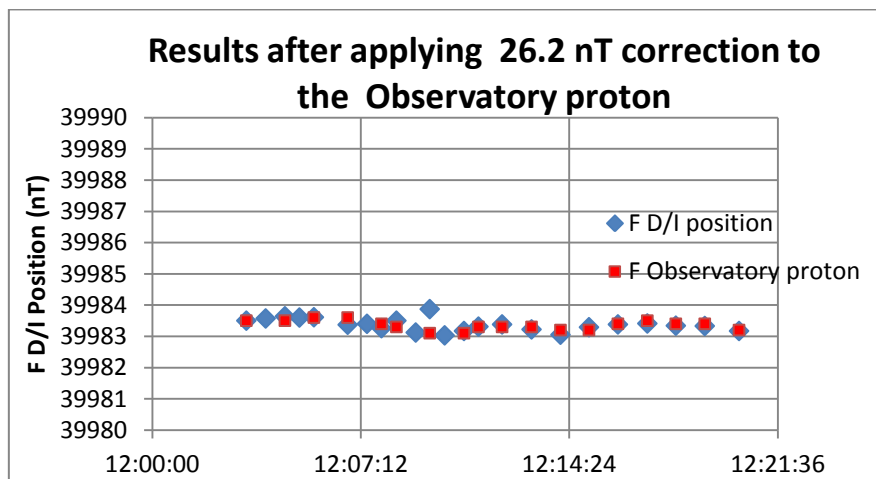
Corrected Observatory proton F and F at D/I position

**31 October 2014.**

Between 1203 and 1220 a further series of measurements were made to check the total field (F) difference between the D/I Observing Pillar and that obtained from the continuous proton.



Plot of Total Field measured at D/I position and Observatory Proton position

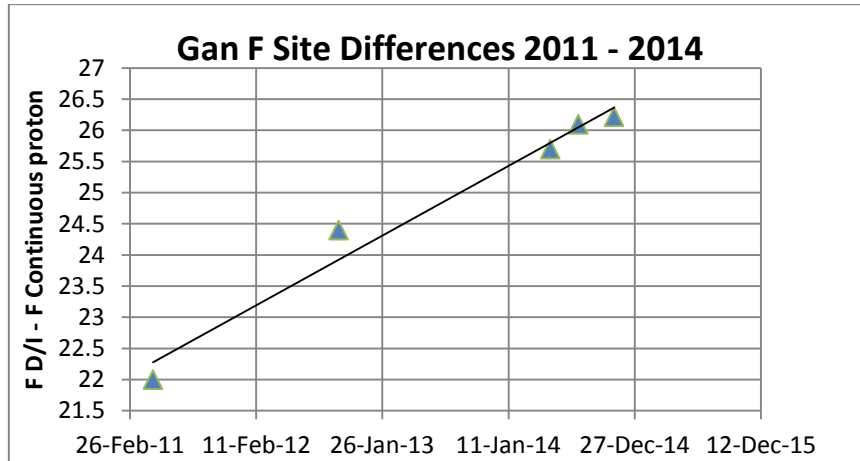


Corrected Observatory proton F and F at D/I position

The results obtained from these measurements indicated an increase in the site difference of 0.5nT from the measurements made in May 2014.

Date	F Difference
01-May-11	22.0
27-Sep-12	24.4
07-May-14	25.7
24-Jul-14	26.1
31-Oct-14	26.2

The Site Difference correction used from May 2014 up to 31 October 2014 was 25.7nT (i.e 25.7 nT was ADDED to F measured by the continuous proton to correct for site difference) It is proposed that from 1 November 2014 this value is increased to 26.2 nT.



Change in Gan Total Field (F) site difference since the observatory was installed in 2011