Gan Magnetic Observatory

Monthly Bulletin February 2013 ETHz System

Ariel view of the Island of Gan located in the south of the Maldive archipelago.

The observatory is located just to the south of the center of the main runway

Gan Observatory

Gan Observatory (IAGA code: GAN)

Location: Gan International Airport,

Addu Atoll, Maldives

Latitude : 00° 41 '40.55" S

Longitude : 73° 09' 13.47" E,

Altitude: 3 m

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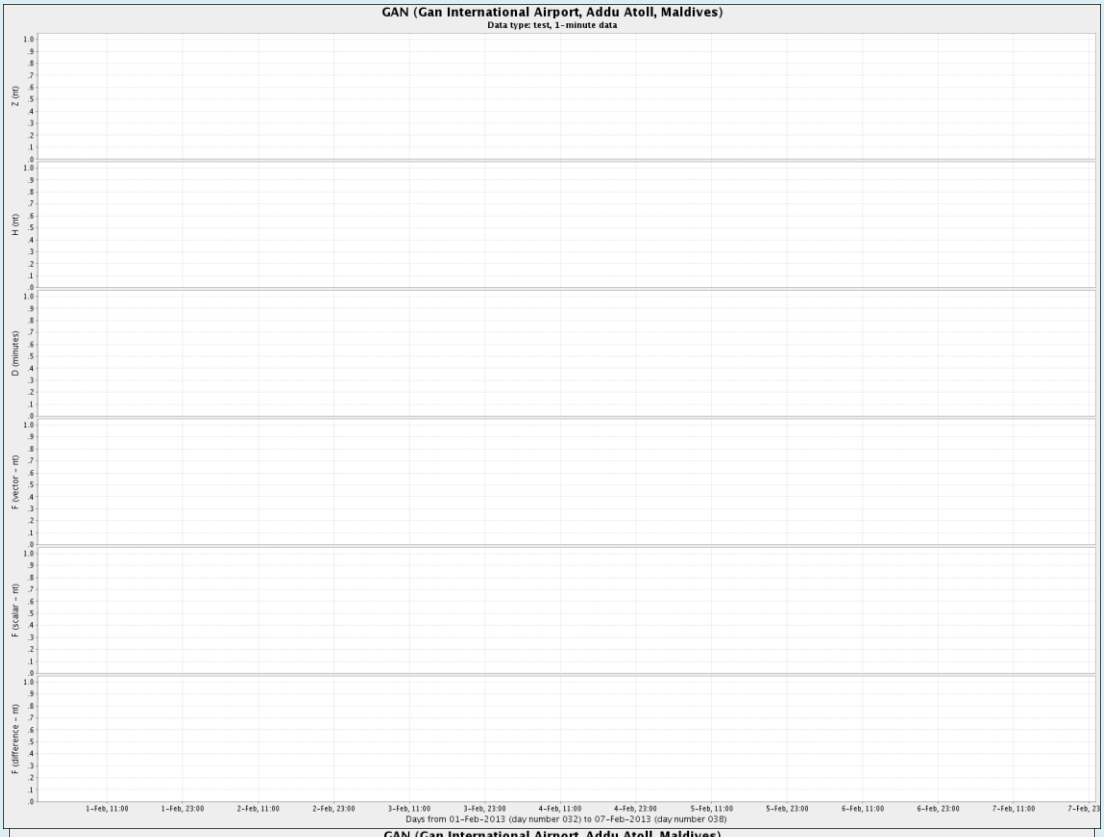
NOTE:
The data used to produce the following magnetograms has been derived from the system installed in April 2011 and must be regarded as preliminary data only. These plots have been generated to check the operation of the data logging system, scale values have not been checked and only provisional baselines have been allocated.

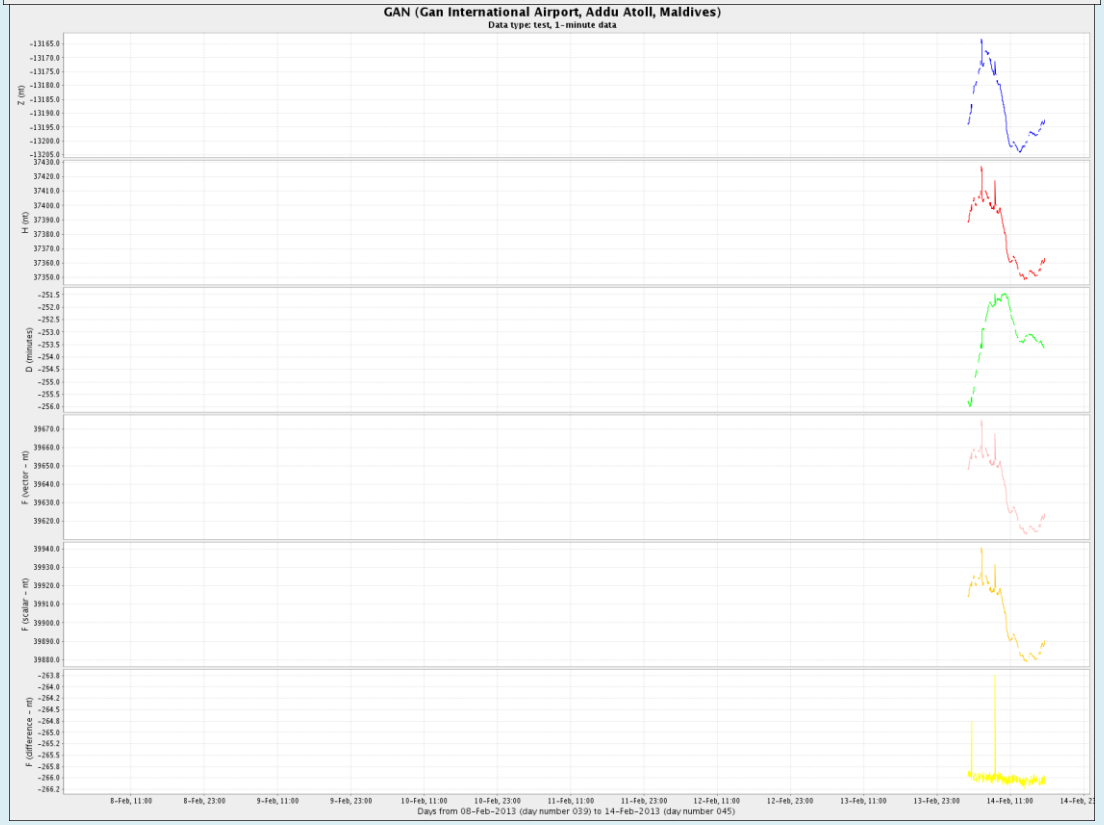
Gan Observatory was installed by the Institut für Geophysik, ETH Zürich, Switzerland in April 2011. The instruments include a DMI Suspended FGE 3 component fluxgate magnetometer measuring variations in the horizontal (H) and vertical (Z) intensities and the changes in the declination (D) along with temperatures in the sensor head and fluxgate electronics. Total Field (F) is measured by a GEM Systems GSM 90 magnetometer which also supports a GPS receiver used to provide accurate timing control for the data logging. All magnetic components are sampled once a second with magnetometer sampling, data storage and systems housekeeping controlled by a low powered UNIX based PC which operates from a 12 Volt supply. As well as storing the data locally a transmission link has been set up between the observatory and the local Meteorological Office in Gan Airport. At this office Internet facilities are available to transmit all recorded data to Zurich where an on-line display has been set up (**http://koblizek.ethz.ch/gan.html**). The observatory is completely self-contained with all power provided using battery backed solar panels.

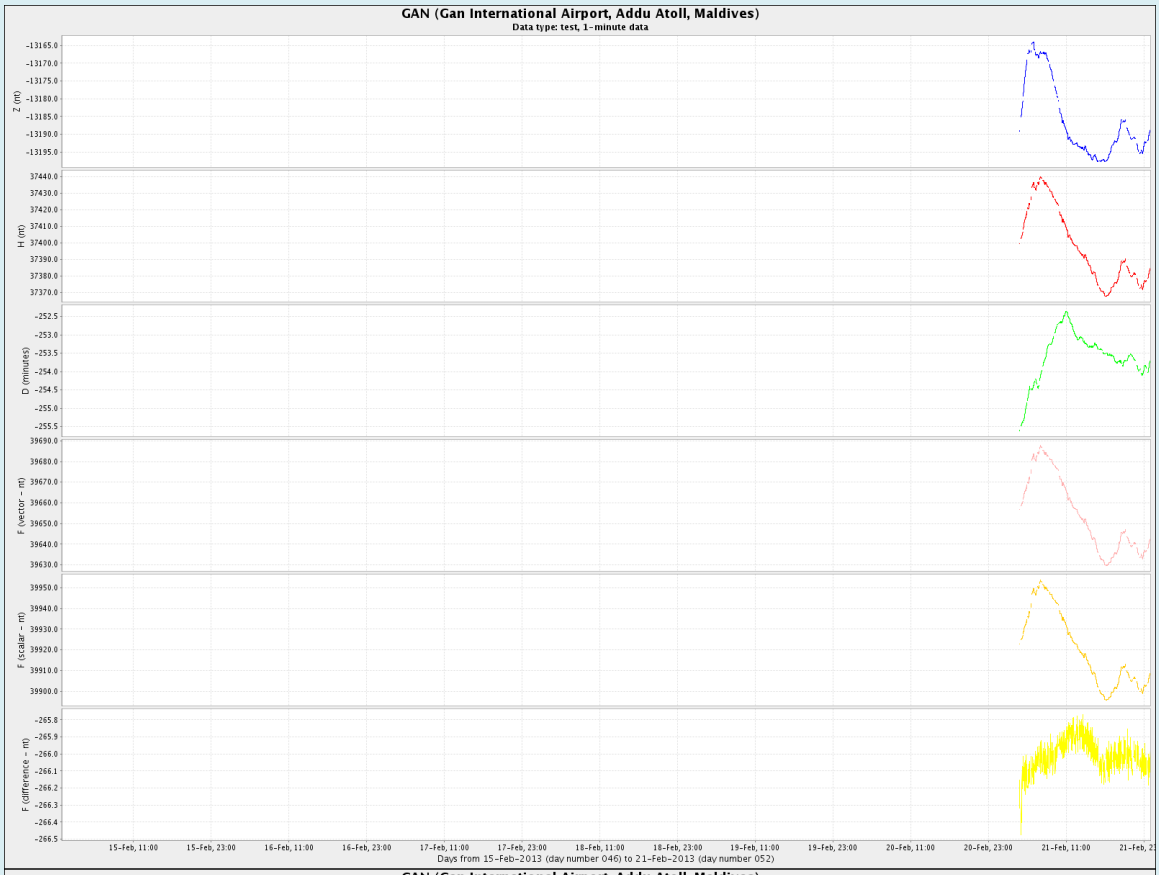
To provide absolute control for the fluxgate variometers an absolute observing position has also been established and in September 2011 a program of regular absolute observations commenced carried out by a local observer.

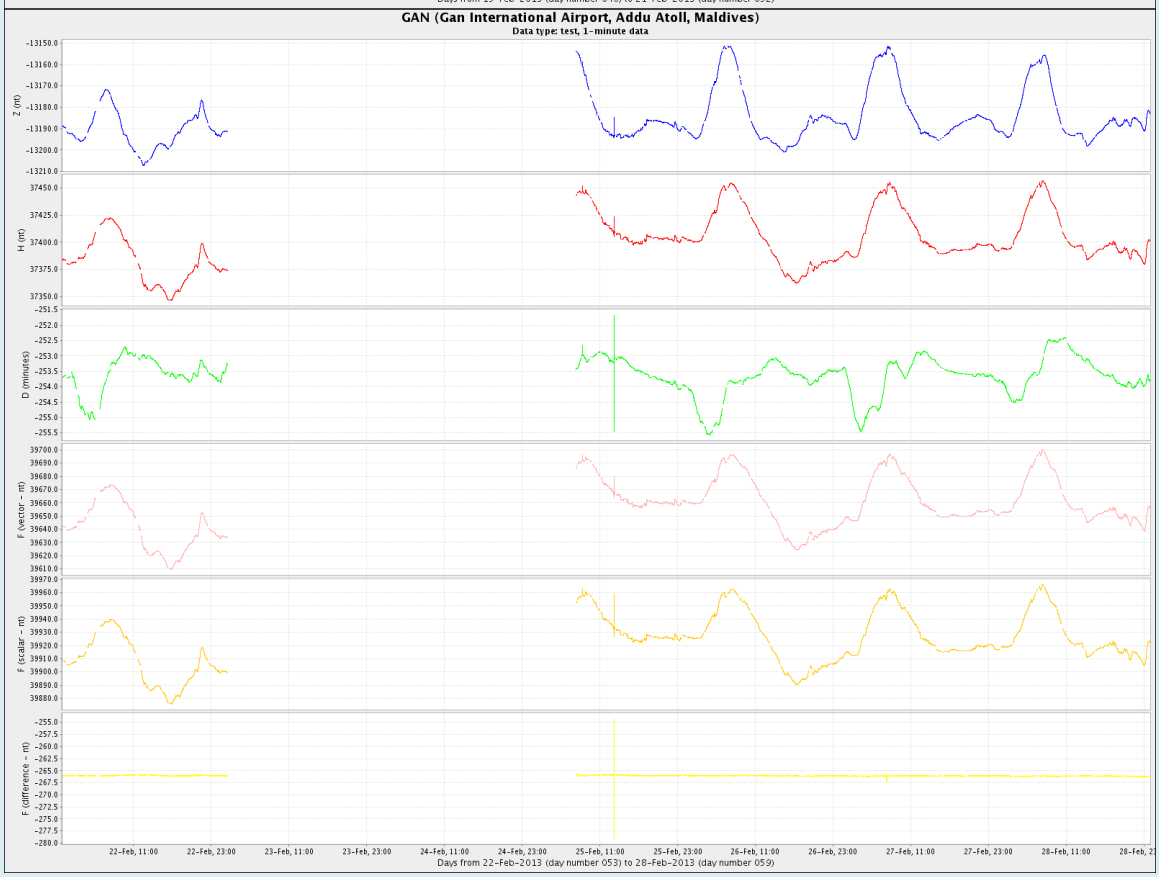
The installation team – left to right, Jakub Velimsky, Chandrasekhar Rao, Lars Pedersen, Ahmed Muslim.

Solar panel array provide a 12 Volt DC supply used to operate the observator


GAN (Gan International Airport, Addu Atoll, Maldives)
Data type: test, 1-minute data
Z (nt)
H (nt)
D (minutes)
F (vector - nt)
F (scalar - nt)
F (difference - nt)
1-Feb, 11:00
1-Feb, 23:00
2-Feb, 11:00
2-Feb, 23:00
3-Feb, 11:00
3-Feb, 23:00
4-Feb, 11:00
4-Feb, 23:00
5-Feb, 11:00
5-Feb, 23:00
6-Feb, 11:00
6-Feb, 23:00
7-Feb, 11:00
Days from 01-Feb-2013 (day number 032) to 07-Feb-2013 (day number 038)


GAN (Gan International Airport, Addu Atoll, Maldives)
Data type: test, 1-minute data
Z (nt)
H (nt)
D (minutes)
F (vector - nt)
F (scalar - nt)
F (difference - nt)
8-Feb, 11:00
8-Feb, 23:00
9-Feb, 11:00
9-Feb, 23:00
10-Feb, 11:00
10-Feb, 23:00
11-Feb, 11:00
11-Feb, 23:00
12-Feb, 11:00
12-Feb, 23:00
13-Feb, 11:00
13-Feb, 23:00
14-Feb, 11:00
Days from 08-Feb-2013 (day number 039) to 14-Feb-2013 (day number 045)


GAN (Gan International Airport, Addu Atoll, Maldives)
Data type: test, 1-minute data
Z (nt)
H (nt)
D (minutes)
F (vector - nt)
F (scalar - nt)
F (difference - nt)
15-Feb, 11:00
15-Feb, 23:00
16-Feb, 11:00
16-Feb, 23:00
17-Feb, 11:00
17-Feb, 23:00
18-Feb, 11:00
18-Feb, 23:00
19-Feb, 11:00
19-Feb, 23:00
20-Feb, 11:00
20-Feb, 23:00
21-Feb, 11:00
Days from 15-Feb-2013 (day number 046) to 21-Feb-2013 (day number 052)


GAN (Gan International Airport, Addu Atoll, Maldives)
Data type: test, 1-minute data
Z (nt)
H (nt)
D (minutes)
F (vector - nt)
F (scalar - nt)
F (difference - nt)
22-Feb, 11:00
22-Feb, 23:00
23-Feb, 11:00
23-Feb, 23:00
24-Feb, 11:00
24-Feb, 23:00
25-Feb, 11:00
25-Feb, 23:00
26-Feb, 11:00
26-Feb, 23:00
27-Feb, 11:00
27-Feb, 23:00
28-Feb, 11:00
Days from 22-Feb-2013 (day number 053) to 28-Feb-2013 (day number 059)

Operational Notes:

To investigate drifts in the Fproton – Ffluxgate (closing error) changes, the Meanwell DC/DC converter supplying DC power to the proton magnetometer was replaced with a TracoPower THL 20-2412WI device on the 8 February. After exchanging this device the PC failed to reboot and it was necessary to replace the PC on 22 February after which time data logging restarted.

These changes, exchange of DC/DC and replacement of the PC have resulted in an increased amount of noise affecting the fluxgate horizontal and vertical components. This noise interference has continued up to the end of the month. This interference can be clearly seen on the F difference magnetogram plots. Investigations into the cause of this interference are continuing.

Tests carried out in March to investigate and isolate the Fp- Ffg drift.

28 Feb – 2 March solar panel disconnected and system running from batteries

2 March – the PC moved, originally on top of proton electronics, a cardboard box approx 7 cm square inserted between the PC and proton electronics.

8 March the TracoPower DC/DC removed and original Meanwell DC/DC converter re-installed.

Throughout March spikes and longer drifts of between 3 and 5 nT have been seen on the H and Z fluxgate data.

On 18 April the extra layers of thermal insulation installed on 13 January around the fluxgate head were removed and it was found that a considerable of moisture, due to condensation had collected around the fluxgate. The moisture on the dome of the fluxgate was dried and both layers of insulation were put back in place.

During May baseline instability problems have continued and on 24 May the top lid of the outer insulating box was removed.

28 June - Fluxgate box opened and inspected – fluxgate dome was dry but there was an accumulation of moisture inside the box.

During July investigations have been carried out into the possibility of installing ventilators in the fluxgate sensor box.

From September 20 to 26 the observatory was visited by Jakub Velimsky and Friedeman Samrock. Telluric equipment was installed, the power distribution to the observatory was

modified and the total field difference between the D/I site and the observatory proton was checked. When the observatory was installed this correction was 22.0 nT on 25 September this correction was re-measured and a correction of 24.2 nT should now be applied. Also note the baseline changes after the service visit.

From 1- 14 October the data from the H component fluxgate was very poor (sudden unexplained drifts) this data was replaced by H calculated from the fluxgate Z and proton F data. From 15 October to 29 October the H fluxgate gave good data but from 30th onwards problems were noted in the fluxgate data with D, Z and fluxgate temperature showing sudden drifts on 31st.

Instabilities in the fluxgate H component continued up to 12th November, from 13th onward all components produced stable results and the signal noise was greatly reduced.

In December 2012 the WiFi link relaying the data from the Observatory site to the Meteorological Office gave problems, this is currently under investigation and a new antenna will be installed in January 2013.

Throughout January 2013 problems continued with the WiFi link between the observatory and the Meteorological Office.
On 16 January 2013 the fluxgate magnetometer was replaced.

Original fluxgate in operation from May 2011 to 16 January 2013

Fluxgate S0331, Electronics E0398

Scale values

X 326.2 nT/V
Y 322.3 nT/V
Z 321.1 nT/V

Replacement fluxgate in operation from 17 January 2013

Fluxgate S0375, Electronics E0475

Scale values

X 314.1 nT/V
Y 315.3 nT/V
Z 314.1 nT/V

February 2013 – During this month problems were experienced with both the WiFi link and the data logging PC, these resulted in considerable data losses as can be seen from the above plots.

On 25 February the site was visited by a member of ETHz staff and the communications and interfacing problems resolved. A new WiFi antenna was installed under the roof of the electronics hut.

The proton interface, USB-RS232 converter was replaced and the USB hub (which was used to connect all instruments (except the Overhauser proton magnetometer) to the USB port on the master motherboard was replaced, unfortunately this did not solve the proton interface problems so finally the data logging the master motherboard was also replaced.