Title:
Non-INTERMAGNET Near Real Time Geomagnetic Networks

Premise:
Networks providing high quality digital recordings in near real time of geomagnetic variations may be of interest to those researchers using INTERMAGNET data.

Proposal:
INTERMAGNET website to list the organizations, their websites and contact e-mail addresses of those organizations capable of providing near INTERMAGNET quality data.

Argument:
There are geomagnetic measuring networks in many places around the world which are not part of the INTERMAGNET association. They fail to meet the INTERMAGNET standards for absolute observations but provide high stability data. The care taken in providing a stable environment to limit pier movement and temperature variations result in quality data over time intervals measured in days/weeks rather than in years/decades. One can think of magnetometers associated with seismic and volcanic activity predictions in California, South America, Japan, etc. As well as networks existing for the study of ionospheric current systems such CARISMA in Canada and the Greenland magnetometer ground stations operated by the Danish National Space Institute.

A brief discussion to illustrate two such networks, CARISMA and the soon to be activated magnetometer sites by Hydro One Networks, follows.

CARISMA (http://www.carisma.ca/)
To quote from the CARISMA website:
"CARISMA (Canadian Array for Realtime Investigations of Magnetic Activity) is the magnetometer element of the Geospace Observatory Canada project."
And:
"In order to properly interpret in-situ satellite data the global state of the magnetosphere must be known, as satellites make only a point measurement that needs a context. CARISMA can provide this information enabling coordinated studies with satellite measurements to performed; this is a particularly important with projects such as the THEMIS mission, and the Radiation Belt Storm Probes (RBSP) mission."

Fig. 1 is a map of the CARISMA network of stations. FGM denotes a fluxgate magnetometer and IGM denotes an inductive magnetometer. Fig. 2 is picture of the NAROD magnetometer sensor in use. Fig. 3 illustrates the site setup in Rankin Inlet, Nunavut, located on the western side of Hudson's Bay.

Additional information can be found in the CARISMA website.

Ontario Hydro Networks Inc.

To study the effects of geomagnetically induced currents (GICs) caused by sudden changes in the geomagnetic field on the transformers and the extended network of the electrical distribution lines, Ontario Hydro Networks and Hazards, Adaptation an Operations Branch/Natural Resources Canada are in the process of activating 6 magnetic variation recording sites at major nodes in the electrical power distribution network. Fig. 4 is a map of the sites in Ontario. Fig. 5 is a Google Earth Pro view of a typical nearby transformer station. Fig. 6 is a picture of a finished site. The left-hand enclosure contains the vault sensor and the right enclosure houses the associated electronics.

The installation procedure consists of:

- Burying a precast concrete vault for the sensor and constructing a non-magnetic enclosure;
- Defining an azimuth with a Leica GPS;
- Permanently marking a N/S azimuth on the sensor vault;
- Aligning and levelling a Bartington sensor in the vault;
- Activating the Bartington Magnetometer and digitally recording the output;
- Performing absolute observations over top of the sensor vault;
- Establish an exterior pier with azimuth for future absolute observations.

Fig. 7 shows the setup for an absolute observation and the defined N/S azimuth within the sensor cubicle. Fig. 8 shows a similar setup for an exterior pier. Fig. 9 is a trial recording from such an installation for the X component at Pinard. Pinawa is a CARISMA station and Ottawa is Ottawa Observatory.

Conclusion:

Geomagnetic variation recording networks having shown to have had a verifiable modicum of care in providing for stable data are worth mentioning on the INTERMAGNET website.

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Acknowledgements:
The CARISMA information and pictures have been taken from the CARISMA web site - http://www.carisma.ca/.
Fig. 4 and Fig. 5 are adaptations of views by Google Earth Pro.
All other pictures by G. Jansen van Beek

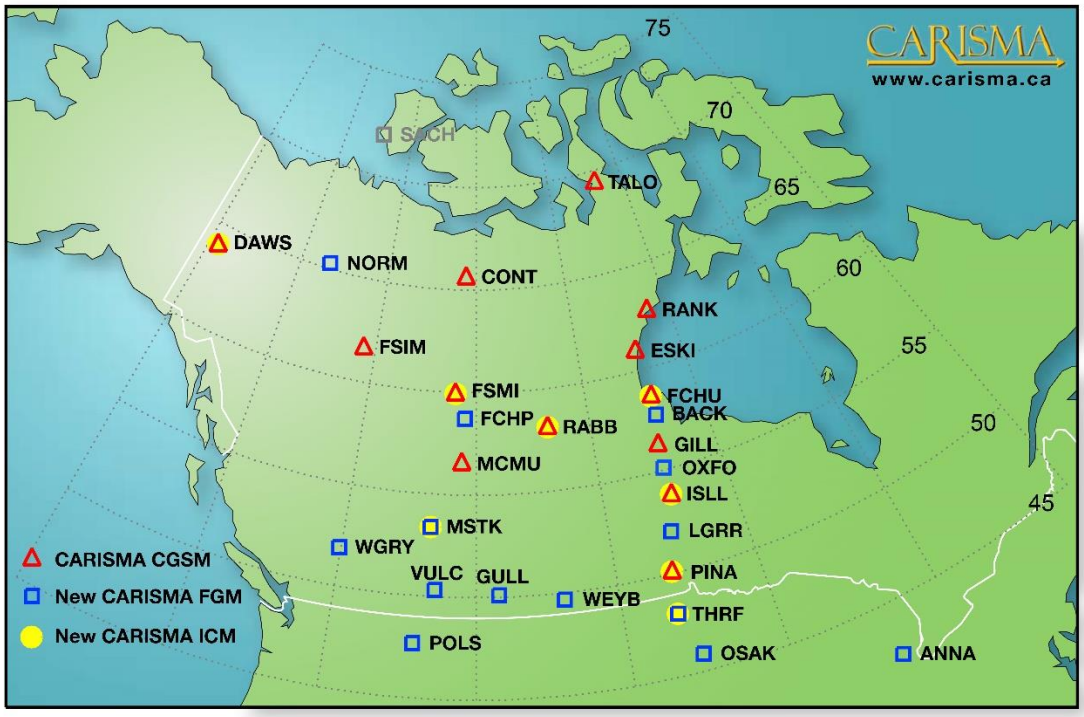

Fig. 1 The CARISMA network

Fig. 2 The Narod Magnetometer sensor

Fig. 3 The Rankin Inlet CARISMA Station

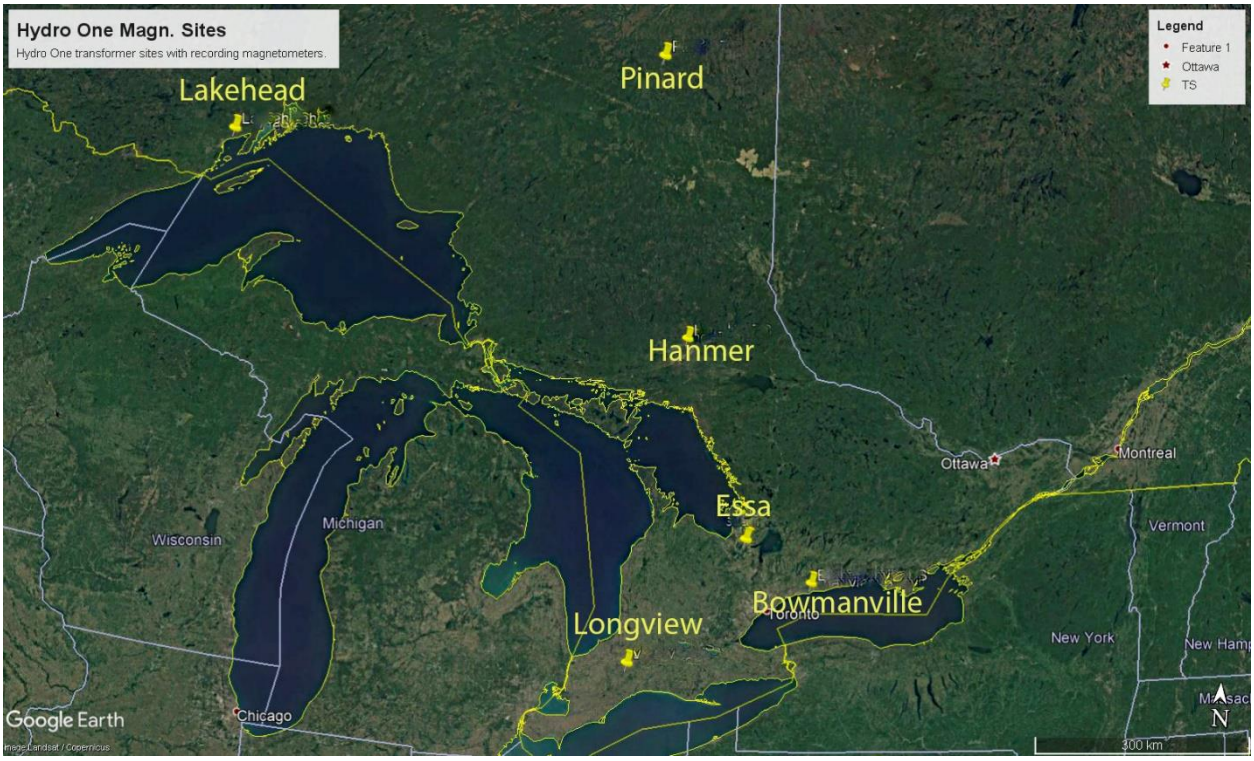

Fig. 4 The Hydro One Networks/NRCan Ontario Magnetometer Sites

Fig. 5 Typical Ontario Hydro Transformer Site

Fig. 6 Finished Enclosures for an OHN/NRCan Site

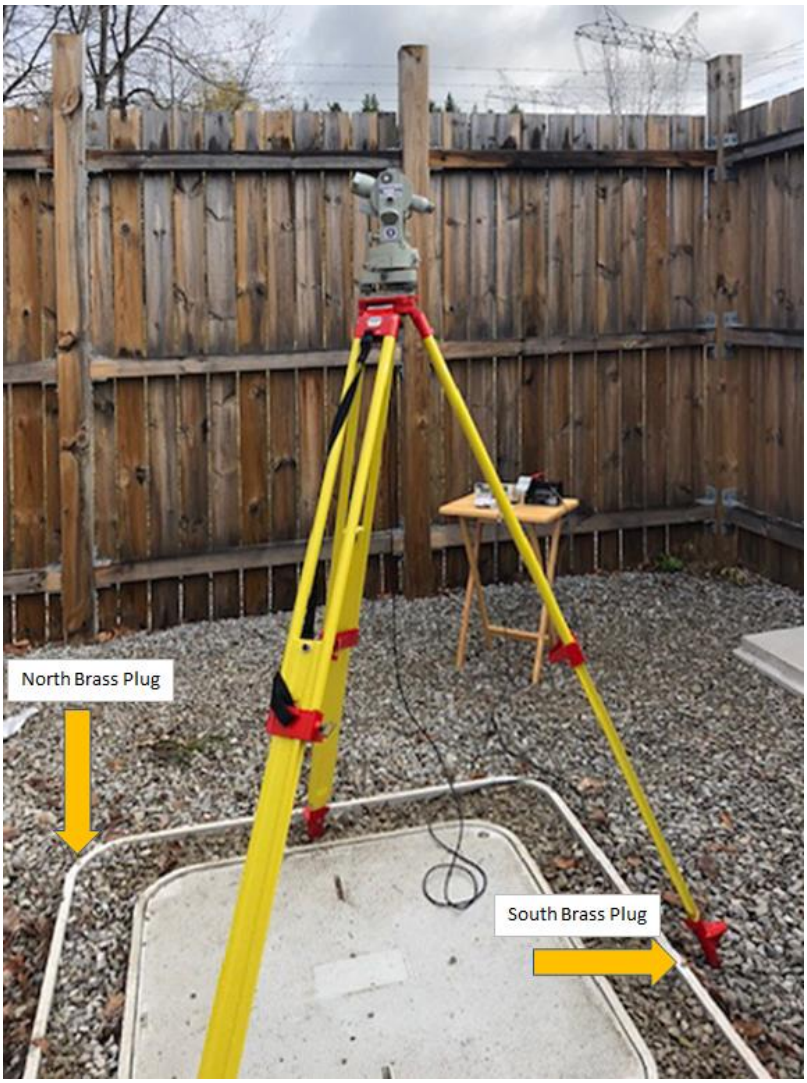

Fig. 7 Sensor Vault with Permanent Azimuth Marks and DIM for Absolute Observations at Essa

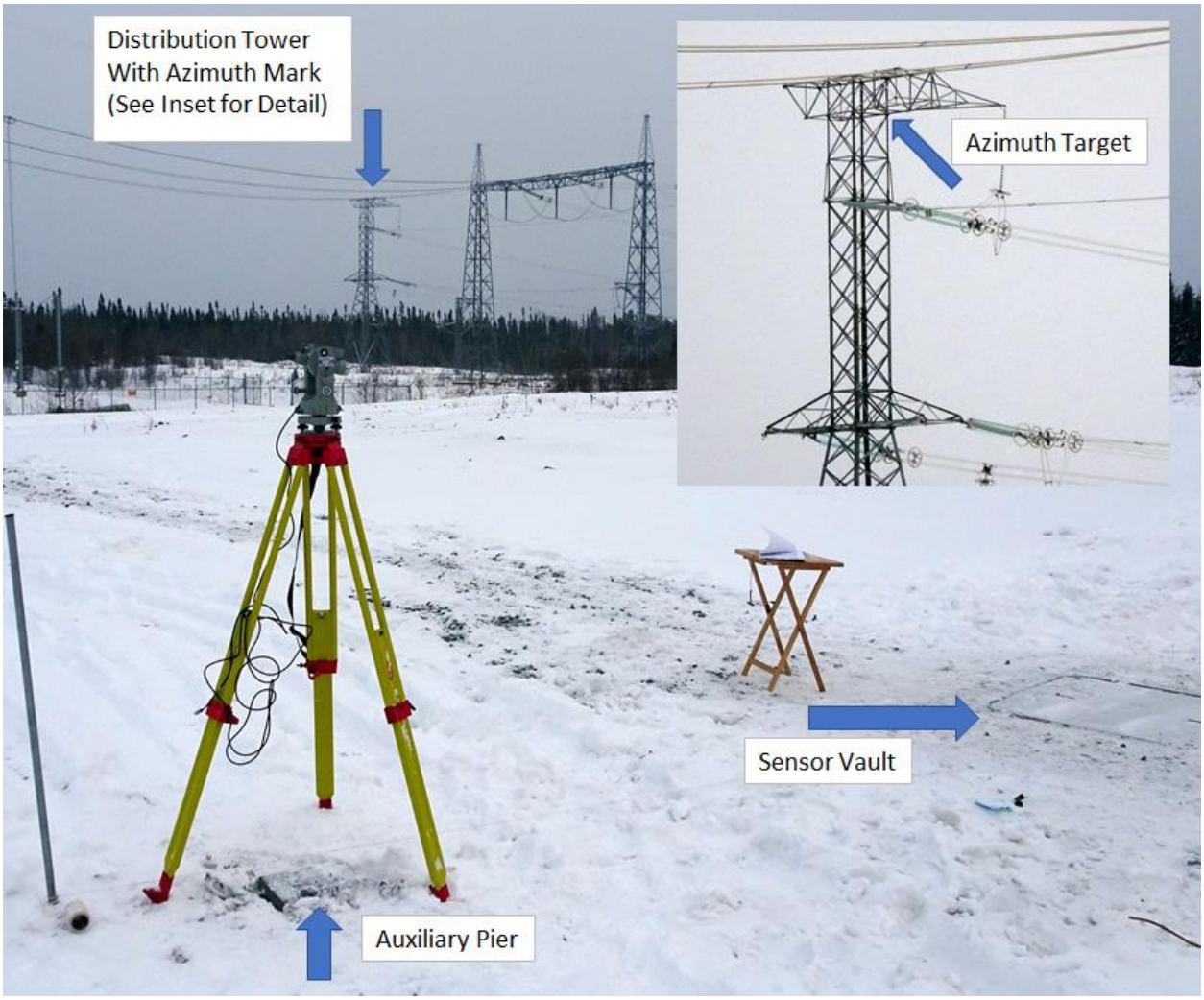

Fig. 8 Auxiliary Pier, Azimuth Mark and DIM for Absolute Observations at Pinard

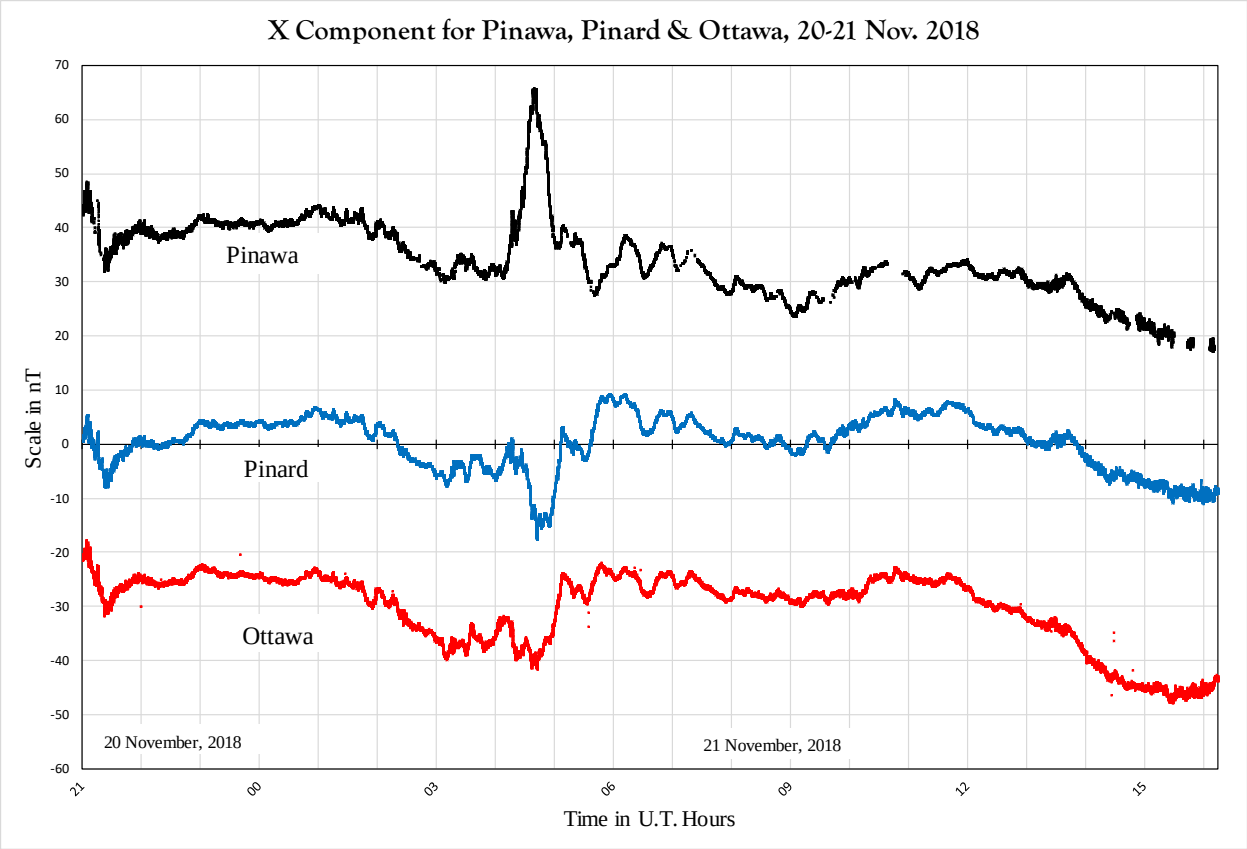

Fig. 9 Sample Recording for a Recently Installed ONH/NRCan Site – Pinard