Edea, Cameroon: The Opening of a New Geomagnetic Observatory

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A new geomagnetic observatory that produce vector data sampled every second has been implemented in Edea, in the southwest of Cameroon since April 2018. It is situated at 2600Km of the nearest magnetic observatory, TSU, Namibia. Following the closure of Bangui observatory, Edea area is an important site for magnetic measurements. The observatory is roughly at a symmetric location to M'bour observatory relative to the magnetic equator. It is too far to the south for studying the equatorial electrojet but its data carry important information on the behaviour of the core and external (ionospheric, magnetospheric) fields in this region. This presentation focused on how the observatory was planned, built and installed, how the local staff was trained and the equipment was set to deliver real-time data sampled every second.

Following the closure of Bangui (BNG) observatory in Central African Republic in 2012 and the opening of a light railway service in Addis Ababa, Ethiopia that led to the closure of Addis Ababa observatory (AAE) in 2015, we started to look for a new site. A collaborating institute was found in Cameroon, IRGM (Institute of Geological and Mining Research).

The observatory was pre-built at the French national magnetic observatory in Chambon-la-forêt, and shipped just before the installation on site at Edea, Cameroon, in April 2018. 3 observers, on site 24h/7, were trained for absolute measurements and basic maintenance.

The site location is situated at 2600Km of the nearest magnetic observatory, TSU, Namibia.

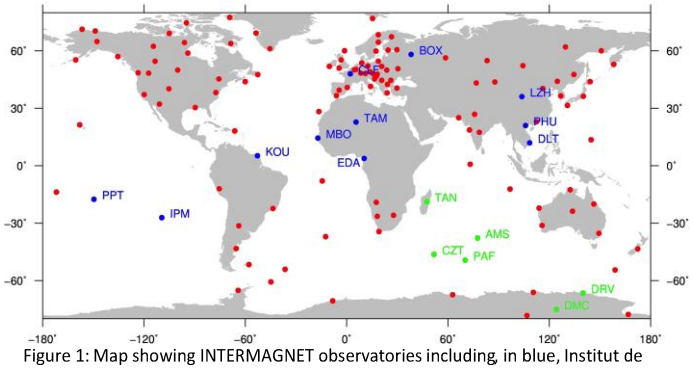

Figure 1: Map showing INTERMAGNET observatories including, in blue, Institut de Physique du Globe de Paris (IPGP) network, in green, Ecole et Observatoires de Science de la Terre (EOST) network.

The absolute and vectorial sensor pillars are fully decoupled from the concrete stab supporting the shelter. One set of instruments (scalar Geomag SM100 + vector LEMI-035) is installed in a fiberglass container with thermal inertia obtained by adding 500 litres of water. The sensors and electronics in this container are therefore in the same environment. 28 V DC sensors are feeding from the main building through a coaxial cable and data communication is through optical fibre.

A 2.5m(L) x 2.5m (l) x 2.1 m (h) absolute shelter made with fiberglass with a plastic opaque dome was installed. The temperature gets extreme in the absolute shelter during the day. This led to the installation of a light source for the azimut mark and a battery-powered theodolite light for late/early measures when the temperature is cooler.

Figure 2: Left: picture of Edea observatory site showing the container with the sensors at the back and the absolute hut at the front. Right: picture of the absolute pillar in the absolute hut.

As a result, the observatory delivers real-time data sampled every second calibrated by a weekly absolute measure. The few first months of raw data show large disturbances on the vectorial magnetometer that needs further investigations. Those disturbances can be due to the proximity of the scalar magnetometer, insufficient grounding or power instability. The few baseline observations done so far are not yet exploitable. Further training of observers is needed.

These issues will be addressed in February 2019 during our next visit to Cameroon.

EDA is only few months old, we hope to reach INTERMAGNET quality soon to apply for membership during 2019.

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