MAGDAS I AND II MAGNETOMETERS IN PERU

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Deployment of magnetometer in Peru

1919	**Geomagnetic measurement in Peru started in 1919 with the construction of a magnetic observatory capable to made absolute measurements also. It was constructed in the place where today is Huancayo Observatory. Department of Terrestrial Magnetism of Carnegie Institution of Washington - DTM CIW constructed the observatory.**
1922	March 1st 1922, continuous photographic recording of magnetograms started at Huancayo Observatory.
1965	In 1965 NASA installed an Askania Magentovariograph in a place near Lima, Ancon.
1984	The first Fluxgate magnetometer built at Geomagnetic Research Laboratory GRL of Tokyo University, was installed at Huancayo Observatory by Dr. T. Araki. A data logger with 1 sec sampling rate was used, recording on commercial cassette tape. Finally this magnetometer was reinstalled at Ancon.
1987	A second fluxgate magnetometer was built at GRL. This Magnetometer was installed at Huancayo Observatory in March of 1988. Then finally moved to Ancon Observatory.
1985	In 1985 the first magnetometer of Kyushu University was installed in Huancayo Observatory.

Location of Geomagnetic Stations and Observatories in Peru

Huancayo Observatory

Ancon Observatory

Jicamarca Radio Observatory

Ica Solar Station

Characato Station - Arequipa

Huancayo Geomagnetic Observatory

Location:
Lat. -12.04° S, Long. -75.82° W
Gm.L(2005). -2.07° Gm. Lg(2005):356.97°

Huancayo data enabled us to determine Magnetic Equator that enables the knowledge of the real shape of the Earth's magnetic field.

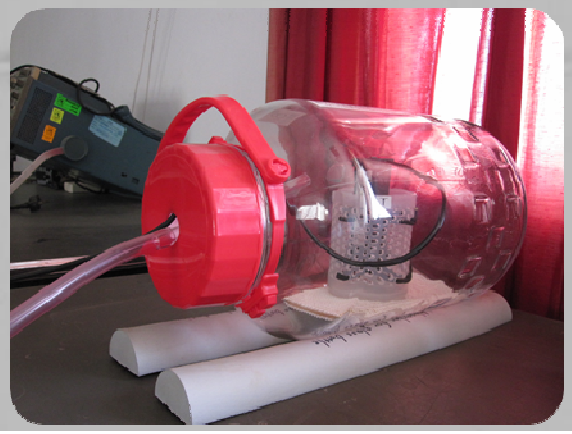
Variation Instrument	Time Res.	Starting Data	Ending Data
HDZ Fluxgate INTERMAGNET	1 Sec	July 1997	Operating and data is available in real time
XYZ Tokyo - ERI	1 Sec.	July 1997	Operating , data is available in real time Earthquake Research Institute of Japan
Eschenhagen DTM CIW No. 2 Variometer	1 Sec	1922	Operating at present, data is available in real time

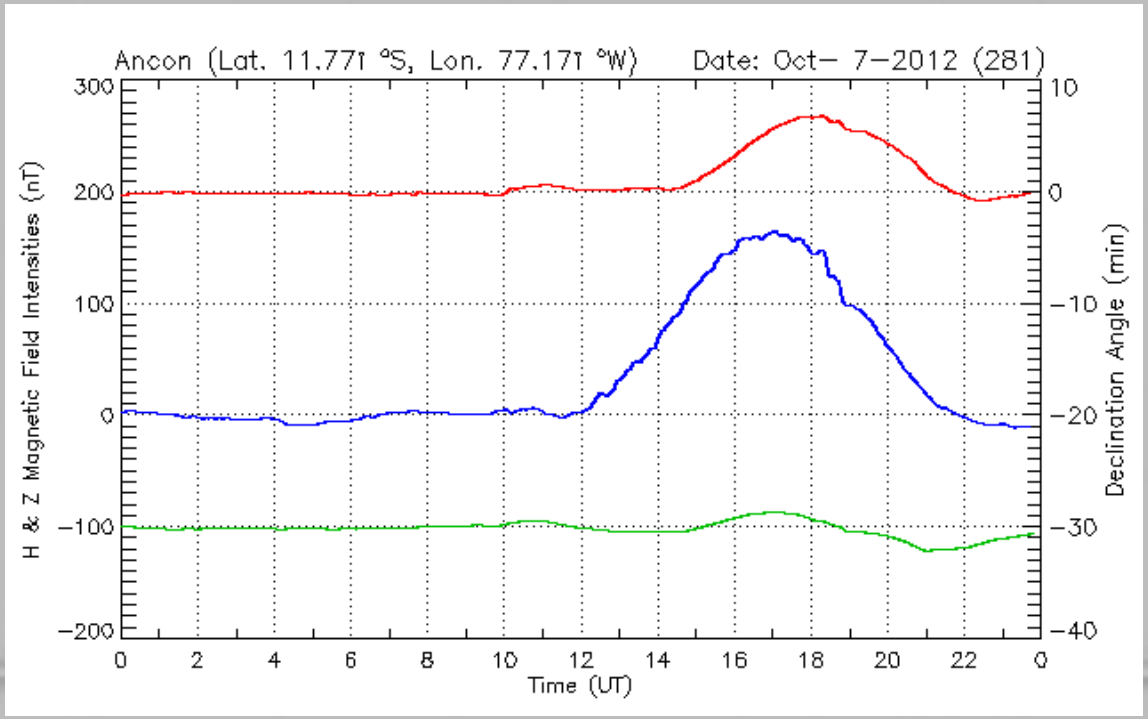
Jicamarca Radio Observatory

The observatory is about half an hour drive inland (east) from Lima and 10 km from the Central Highway (latitude 11.95° South, longitude 76.87° West), they have installed some magnetometers in different stations for Low Latitude Ionospheric Sensor Magnetometer Network (**LISN)**

Station	Variation Instrument	Time Res.	Starting Date	Operating Status
Leticia (LET) Colombia (-4.19 -69.94)	HDZ LISN Magnetometer	1 Sec.	April 2009	Operating at present
Puerto Maldonado (PMO) - Peru (-12.58 -69.18)	HDZ LISN Magnetometer	1 Sec.	March 2008	Operating at present
El Leoncito (LEO) Argentina (-31.00 -69.29)	HDZ LISN Magnetometer	1 Sec.	September 2008	Operating at present
Alta Floresta (ALF) - Brasil (-9.87 -56.10)	HDZ LISN Magnetometer	1 Sec.	November 2010	Operating at present
Cuiba (CBA) Brasil (-15.56 -56.07)	HDZ LISN Magnetometer	1 Sec.	November 2010	Operating at present

Ancon Observatory (GRL+WDC)





Location:
Latitude -11.77° S, Longitude -77.17° W
Gm(2000). L. 3.10° Gm. Lg.(2000): 354.66

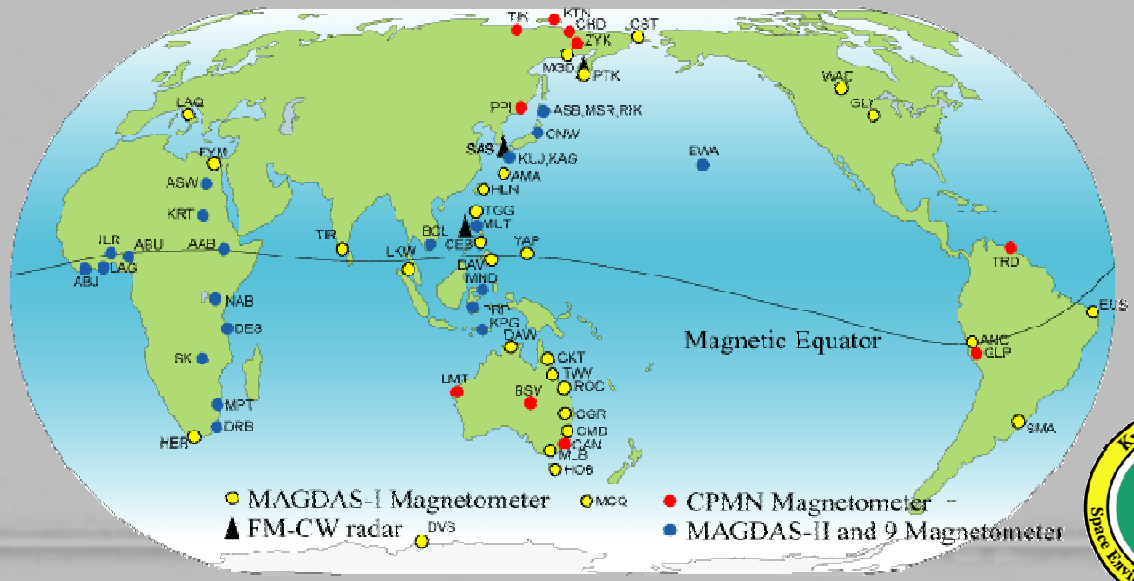
A fluxgate magnetometer was built at GRL in 1987, improving the first design, the analogue output is between ± 10 volts equivalent to ± 500nT. After recording test made at Kakioka Magnetic Observatory this Magnetometer was installed at Huancayo Observatory in March of 1988. Data recording is on a PC based data acquisition system, equipped with a 12 bits ADC and an own software developed for data acquisition. Actually it is working at Ancon Observatory, data transfer is in real time.
Recently electronics were renewed thanks to WDC-Kyoto support, since that also barometric pressure data is available (PI: Dr. T. Iyemori).

Ancon Observatory (CPMN to MAGDAS)

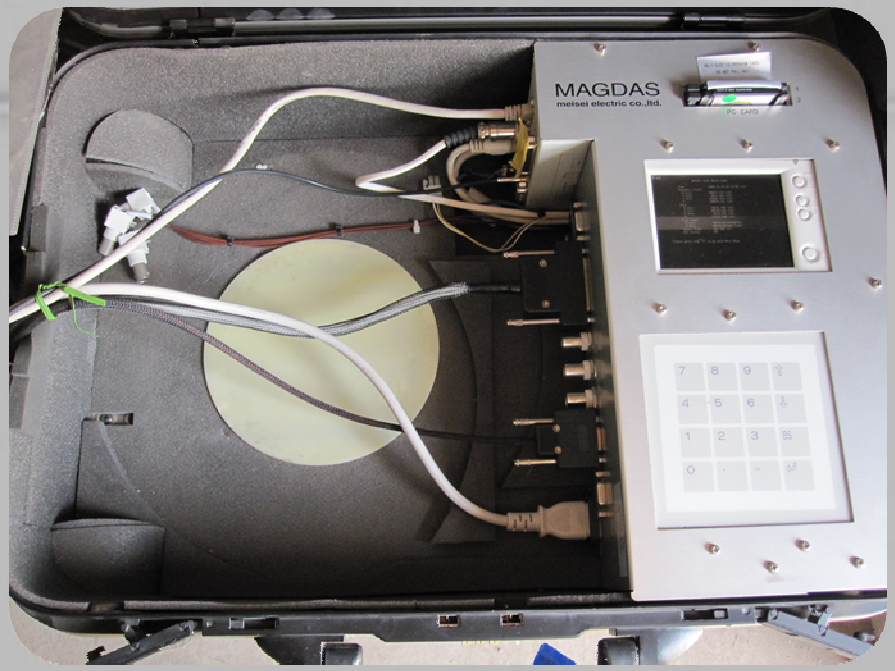
Location:
Latitude -11.79° S Longitude -77.16° W
Gm(2000). L. 3.10° Gm. Lg.(2000): 354.66

In 1985 the first magnetometer of Kyushu University was installed in Huancayo Observatory, then it was moved to Ancon Observatory in 1994 that has almost same latitude with Huancayo.
One part of The Equatorial Magnetic Observation Network (PI; Prof. T. Kitamura) was renewed and installed: Huancayo, Ancon, Cañete, Guadalupe and Piura stations, then it became the Circum-pan Pacific Magnetometer Network (PI of CPMN; Prof. K. Yumoto), data record is in flashcards.

MAGDAS/CPMN
(MAGnetic Data Acqusition System/Circum-pan Pacific Magnetometer Network)



Ancon Observatory – MAGDAS I



For space weather study and application, the Space Environment Research Center (SERC), Kyushu University deployed a new real-time MAGDAS (MAGnetic Data Acquisition System) in the CPMN region (Yumoto and MAGDAS Group, 2006, 2007). On October 13th of 2006 SERC of Kyushu University installed a new MAGDAS magnetometer in Ancon.

Highest Data Resolution: 1Hz

Data Volume: ~3Mb/day
IP Address: A fixed IP address
Time Correction: GPS

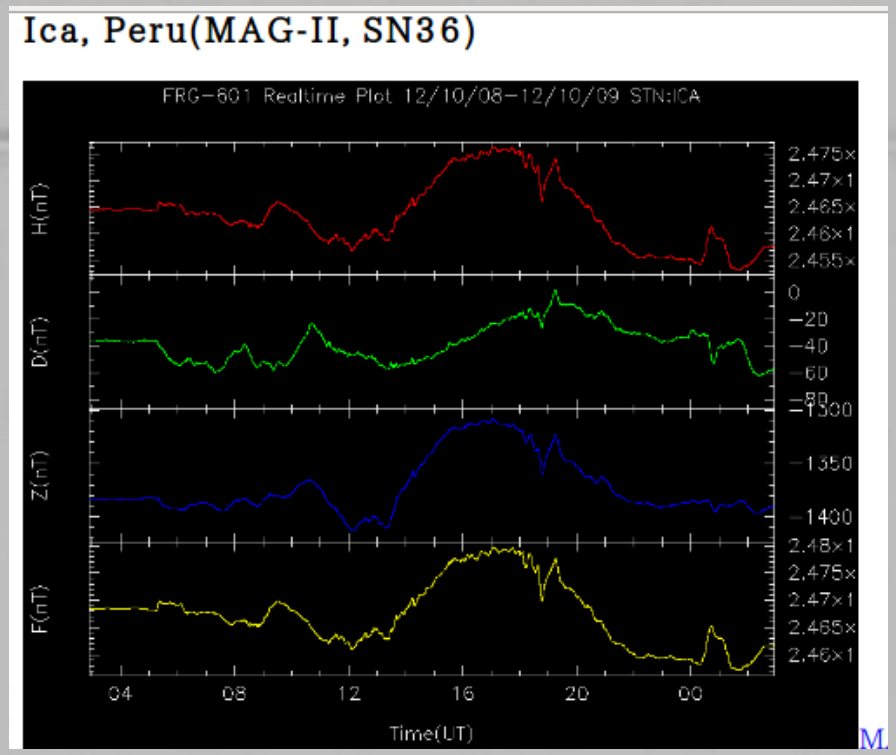
Kyushu University
SERC
Space Environment Research Center

ICA Solar Station – MAGDAS I I

On July 14th of 2011,SERC of- Kyushu University, installed MAGDAS II in ICA Solar Station at San Luis Gonzaga National University, located 300 km south of Lima.:
Lat. 14.04º S Long.75.44º W.
This magnetometer was a CPMN then refurbished and became MAGDAS II
Characterics: Magnetometer: FR 601, Data Transfer: Armadillo, Highest data resolution: 1Hz
Time Corecction: GPS

Kyushu University
SERC
Space Environment Research Center

ICA Solar Station - MAGDAS II



MAGDAS is one of the largest ground magnetometer array in the world. Ancon and Ica stations send geomagnetic data to the Space Environment Research Center (SERC) at Kyushu University of Japan.
Ancon station send data in real time and Ica Solar Station in near real time.

Seems that yesterday we were hit by a Solar Wind, this is yesterday MAGDAS II record

Kyushu University
SERC
Space Environment Research Center

Summary and Conclusion

- MAGDAS II actually working very well
- Operativity of magnetometers in Peru is very important because of Magnetic Equator

Thank you very much for
your attention!