Installation Of A Broadband Seismological Station In The Faixa Paraguai

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Abstract

This project is a just the beginning of the study of the seismicity and tectonics at the Faixa Paraguai, located at Mato Grosso and Mato Grosso do Sul (states from the middle-west of Brazil). The region is well known for the geological faults and folds and has a peculiar structure compared to the Craton Amazonico.

To better study the structure, there is the demand to install a seismological station and then to speculate on receptor function, seismic tomography and other things.

The data analysis will be responsability of the Seismological Observatory of The Brasiília University (SIS/UnB) such as this whole project.

The first travel will be done by the first week of June of 2011 and the installation will be concluded by 2 days. Until the date of the congress, we expect that the station works fine and show some results about the seismicity in the area.

Introduction

The zone presents granitoids from the neoproterozoic period and other crustal structures that evidence two magmatic events. The area is a perfect example of intraplate seismicity.

The seismological observatory has detected many events near the area and published one bulletin for each one of then on their website www.obsis.unb.br .

Soon, the study of the speed of compressive and shear waves will enable the study of tomography to map the subsurface and the composition of the basement around.

Method

The equipment is a CMG – 3TD (Güralp), linked to a TH-11 (Sprengnether) to condicionate the signal under a sampling rate of 100 aps.

FIGURE 1: CMG – 3TD Güralp seismometer.

The first thing to do is to find a outcrop body of a solid rock. Then, a hole is dig into the rock and the seismometer is fixed. The coordinates of the seismometer (North-South, East-West and Vertical) are calibrated using compasses and GPS system (also used to read the correct position of the seismometer).

There're a few wires to connect the seismometer to a seismograph, that interprets the signal generated by the seismometer. The seismograph stays in the surface and kept into a small accommodation.

The data will be sent to the seismological observatory, a broadband network is installed under the restricted access of the observatory and the data will be read by the Güralp Scream! Software, which has a nice human-computer interface and makes the analysis of the digital seismogram easy and fast.

Examples

The same system is used in Serra do Facão station (SFA1), near a hydroelectric plant located in Catalão-GO.

The installation occurred in march 31, 2009 and the station has an excellent operation (around 99% of the day).

The precise location of the station is Lat: 17º58'14,63"S Long: 47°42'06,34"W. The magnetic declination is 20,5°.

Attached to the station, there're 6 solar panels of 75W each, Solar charge regulator CX40, DC/AC converter.

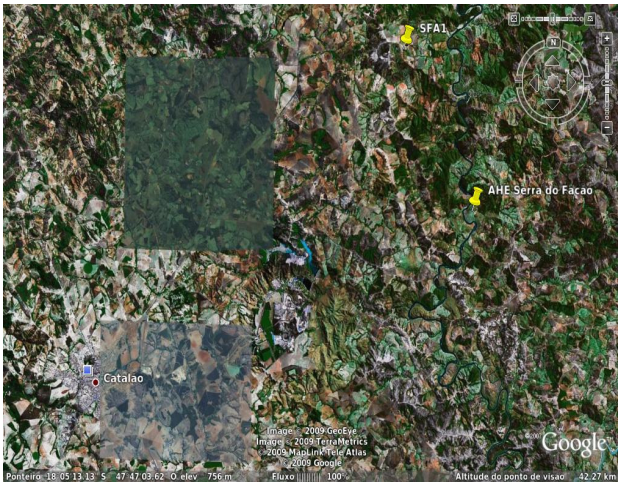

FIGURE 2: Map showing the location of the hydroelectric plant, the city of Catalão-GO and the station SFA1.

FIGURE 3: The compass showing the orientation of the seismometer to the geographic north with a magnetic declination on 20,5°.

FIGURE 4: Installed seismometer (isolated, oriented and horizontally leveled).

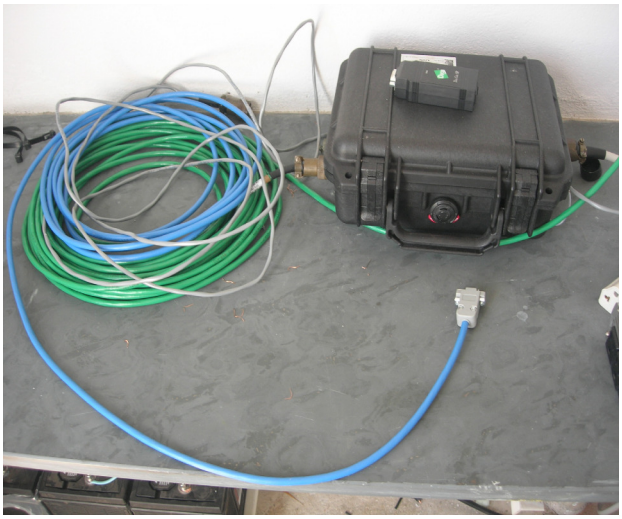

FIGURE 5: Digital register (seismograph).

FIGURE 6: Solar panels over the accommodation.

FIGURE 7: Position of the solar panels over the roof of the accommodation.

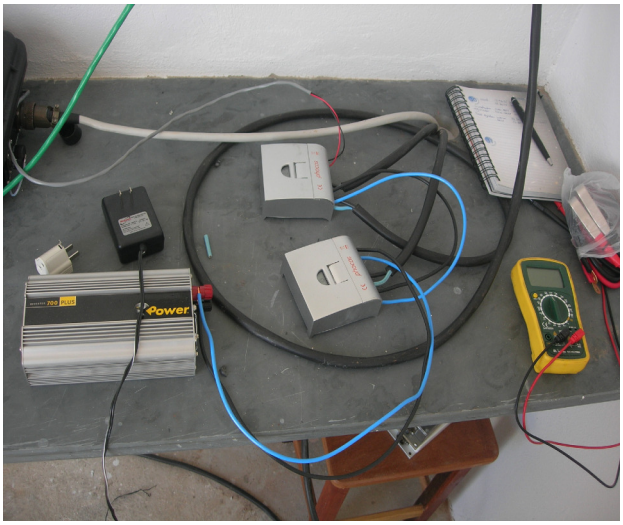

FIGURE 8: Electric circuit with the charge regulators.

Unlucky, the analyzed seismogram cannot be shown by copyright of the Serra do Facão Electricity Company, but the seismogram from Faixa Paraguai station will be analyzed as soon as the data comes to seismology observatory.

Results

Results will be shown after the complete installation of the station.

Conclusions

Scientists of geological structures will be very grateful for this project and will have many possibilities of studies and developing the area of seismology.

Acknowledgments

UnB

Observatório Sismológico

CNPq
Conselho Nacional de Desenvolvimento Científico e Tecnológico

geo
Soluções em geofísica e geotecnologia

SBGf

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