Present status of BSRN-FLO

Sergio Colle (sergio.colle@ufsc.br) and Rubinei Dorneles (rubinei@lepten.ufsc.br)

06/1994 - starting operation

Picture of the old BSRN platform

Station	Short name	data submitted Years	94	95	96	97	98	99	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14
Florianopolis	FLO	Sergio Colle (sergio.colle@ufsc.br)	X	X	X	X	X	X	X	X	X	X	X	X	X							X	X

12/2005 - interruption of the data submission to BSRN archive

Reasons:

- resign of the deputy site;
- lack of support for remaintenance and operation;

inconsistency of longwave data due to incorrect implementation of the equation of OLR in the datalogger code (jan/2006 - jul/2008) already corrected at CPTEC/INPE.

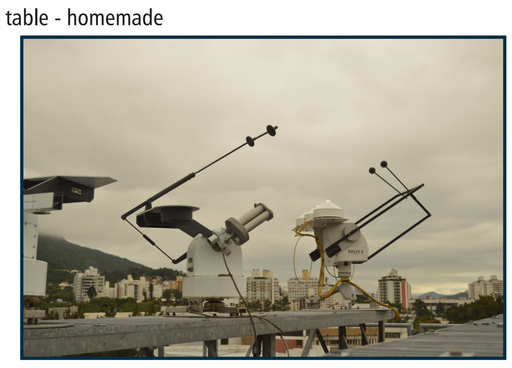
01/2013 - new personnel under contract for operation and data handling

- acquisition of new equipment with funding provided by Ministry of Science and Technology in the frame of a research project:
- K&Z Solys 2 Sun Tracker
- K&Z CM 22 Pyranometer
- K&Z CGR4 Pyrgeometer
- K&Z CHP1 Pyrheliometer
- Campbell CR 3000 datalogger
- Tri-band Spectro-heliometer ICU-3J25 - measurement of three spectral bands to evaluate the performance of concentrating PV Cells

Calibration Facility

- The calibration of the pyranometers and pyrheliometers are made against the HF radiometer;
- The intrumenst can be directly installed in the platform of a Smart Eppley Tracker controlled by a proper software operated by ordinary PC;
- The calibration of pyranometer can also be made by using the shade-unshaded method;
- The HF radiometer is going to be sent to NREL to join the reference radiometers comparison test to be held in September-2016.

Shade-unshade calibration table - homemade



Picture of the three solar trackers, one of them for radiometers calibration

Data collection of a three spechtral band radiometer for concentrating PV application (related to ABENGOA research project)

Indoor controls of the trackers and data collection

08/2013 - Restarting data collection and control according to BSRN software and rules

- The qualified collected data is currently being sent to BSRN-archive;
- The data are accessible online at notus.lepten.ufsc.br.

Sample of data collecting in the data aquisition monitor

Ongoing research activities

- A novel concept of a solar water heating system for domestic use is being tested. The system is controlled by solar radiation forecast algorythm, in order to minimized the electric auxiliary energy consumption (master thesis);
- Development of simulation platform for solar power plants in Brazil

View of the solar water heating system and the BSRN Station.

Collector test platform

- Flat plate collectors are currently tested by using the quasi-dynamic method, according to appropriate ISO standards. The platform and control units were homemade.

Solar collector test banch and peripheric control units

A new control platform for the EPLAB Automatic Sola

- Development / validation and implementation of novel software compatible with currently commertialized Pcs to control tracker model SMT. The Eppley Trackers were previously controlled by troublesome HP palmtops. The metioned software was designed by the engineering student Mr. Guilherme Gonçalves.

New BSRN Station building

- The station is sorrounded by buildings wich interfere in the horizon view
- In order to minimize building interference, in 2017 the station is going to be installed in the top of an eight floors laboratory building.

View of the eight floors laboratory building from the roof of the solar energy laboratory building.

PHD Thesis of Rubinei Dorneles

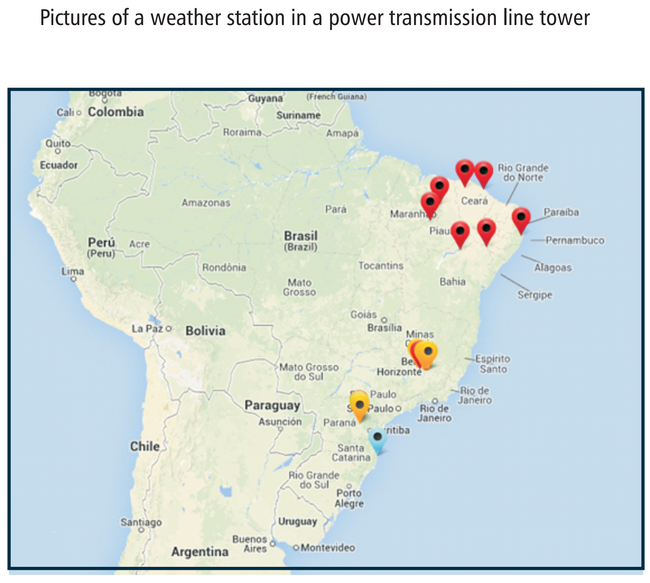
- Downscaling over Brazilian high voltage power transmission lines for mapping sites of lowest ampacity (high correlation of minimium wind speed, maximum ambient temperature and maximum incoming solar radiation);
- Forecasting weather parameters over the power lines - validation against data collected from 21 compact weather stations located at top of the power lines towers.

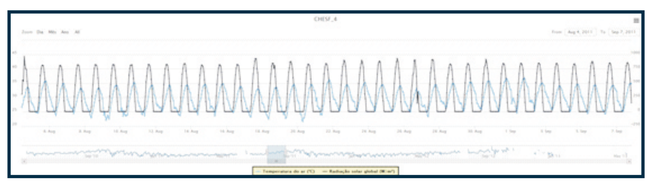
Weather stations located at the top of towels of power transmission lines

- Compact sensor WXT 520 - Vaisala (Measurement 6 most essential weather parameters);
- SP LITE2 K&Z pyranometer (GHI) with spectral range 400 to 1100nm, sensitivity 60 to 100 $\mu V/W/m^2$ and directional error (up to 80° with $1000W/m^2$beam)$<10W/m^{2;}$
- High frequency: average values each of 10 minutes - qualified data in real time (MADIS QC and Triggers and Stored Procedures Database);
- The data are used for assimilation and/or evaluation of the WRF and ARPs Models (weather simulaton and prediction).

Specifications	Thermopile (CM22)	Photodiode (SP LITE2)
Spectral	200 nm to 3600 nm	400 nm to 1100 nm
Response time	5 s	< 500 ns
Temperature	0.5% from -20 to +40 °C	<-0.15% per degree C
Sensitivy	7 to 14 µV/W/m²	60 to 100 µV/W/m²
Stability	< 1% per year	< 2% per year
Directional error (up to 80° with 1000 W/m² beam)	< 5 W/m²	< 10 W/m²

Pictures of a weather station in a power transmission line tower





Sample of data collected in a particular station