



# Preliminary results of the first six months operation of the Selegua Station in Southern Mexico



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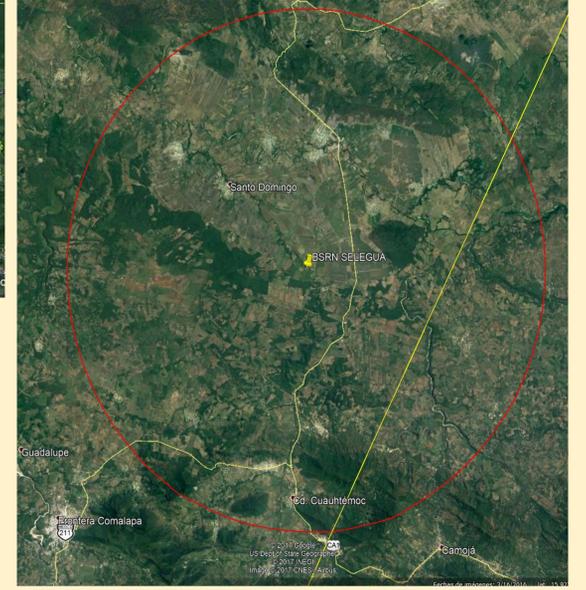
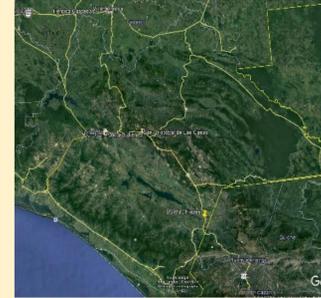
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## Introduction

Renewable energy projects depend on proper technical and financial planning that requires the availability of reliable information about the energy resources that can be used for industry and electricity generation. For the case of solar energy, in Mexico, it was established a reference solarimetric network of fifteen stations during the last three years. The last of them (Selegua), is located in southern Mexico (Figure 1) in the State of Chiapas very near to the Guatemala border and has been proposed as candidate station for the Base Surface Radiation Network (BSRN).

## STATION LOCATION

Latitude: 15°47'2.46" (15.784016°) N  
 Longitude: 91°59'24.63" (-91.990174°) W  
 Elevation: 602 (MSL)  
 Local Time GMT -06  
 Topography Type: 2 (Flat, Rural)  
 Surface Type: 15 (grass)



## Instruments and data

The Selegua station was installed and start operations in November 2017. It is the first of its type in Mexico and one of the few covering tropical environments around the world. The station measures beam, diffuse and global radiation and at least once a week measures with an absolute cavity radiometer are taken for reference and quality control of the data, also spectral parameters such as long wave radiation, UVB and illuminance and meteorological data are recorded. The following pictures show some of the instruments, the arrangement and the acquisition systems.

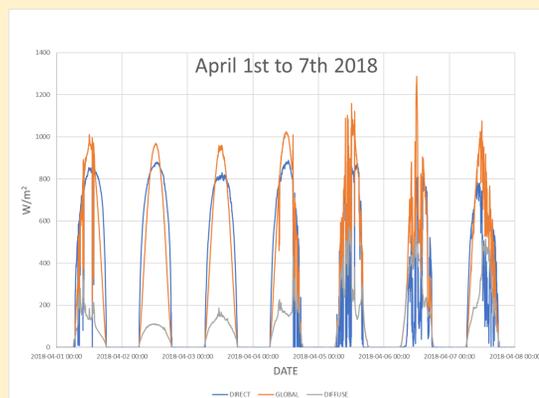


## Results

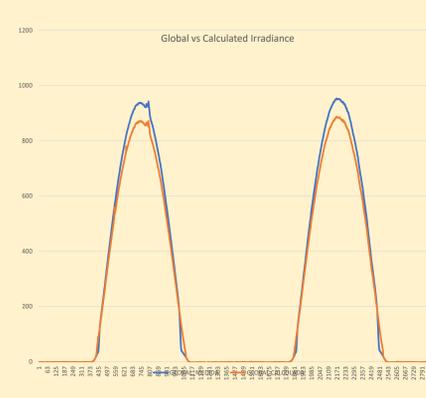
After the firsts months of operations, recorded data show the relevance of a site in this location and allow to analyze particularities of monthly ad seasonal behavior of solar radiation information. For instance, normal solar radiation values over 400w/m<sup>2</sup> are reached very early in the morning until late in the afternoon even in winter months with low solar angles. Differences of winter and spring skies are also well characterized due to the cloudiness, humidity, and aerosol components. QA/QC procedures are doing on a daily and monthly basis, such as the daily number of records, comparisons between calculated and measured global radiation, scatterplots comparing data from pirheliometers and the cavity radiometer among other processes .

DATE	DIRECT	DATE	GLOBAL
2017-11-13 12:25	1010	2018-05-22 12:23	1407
2017-12-29 11:51	986	2018-05-22 12:37	1397
2017-11-13 11:52	984	2018-05-22 12:24	1394
2017-11-13 12:26	976	2018-05-22 12:49	1384
2017-11-13 10:20	975	2018-05-22 12:50	1374
2017-11-13 11:58	975	2018-05-22 13:06	1364
2017-11-13 12:10	975	2018-05-22 11:51	1358
2017-11-13 10:21	974	2018-03-14 11:36	1349
2017-11-13 12:07	974	2018-05-22 12:28	1346
2017-11-13 12:08	974	2018-05-22 11:20	1340
2017-11-13 12:22	974	2018-03-14 11:34	1331
2017-11-13 12:36	974	2018-05-26 12:54	1324
2017-11-13 11:28	972	2018-05-22 11:19	1322
2017-11-13 11:29	972	2018-05-22 12:51	1318
2017-11-13 11:40	972	2018-05-22 12:52	1313
2017-11-13 11:49	972	2018-03-14 11:35	1305
2017-11-13 11:55	972	2018-05-26 12:45	1301
2017-11-13 11:36	972	2018-05-22 10:48	1295
2017-11-13 11:59	972	2018-05-22 10:39	1289
2017-11-13 11:27	971	2018-05-22 12:38	1287

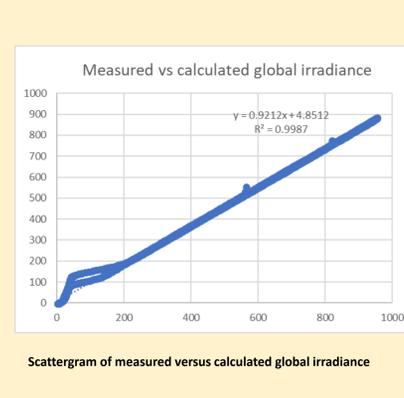
Maximum values of direct and global irradiances



Plotting of one week of april of direct and global and diffuse irradiances



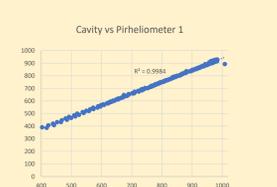
Quality assessment plotting of measured versus calculated global irradiance



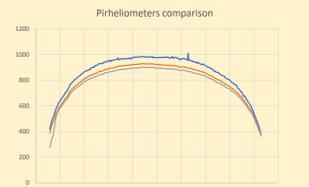
Scattergram of measured versus calculated global irradiance

Date	Starting time	Final time	Observation hours
08-01-2018	07:20:02	17:18:02	10
10-01-2018	07:40:02	16:28:02	9
12-01-2018	08:21:03	14:29:03	6
15-01-2018	07:29:02	14:27:02	7
22-01-2018	07:16:03	14:14:03	7
06-02-2018	07:09:02	17:37:02	10
12-02-2018	07:16:02	12:40:02	5
14-02-2018	07:34:02	17:42:02	10
22-02-2018	07:10:03	17:30:03	10
26-02-2018	07:07:03	17:27:03	10
08-03-2018	07:02:03	17:32:03	10

Dates and hours of absolute cavity radiometer measurements



Scattergram of absolute cavity and one of the pirheliometers



Plotting comparing the three pirheliometers