



Global Warming: The Science of Climate Change

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Peer-Assessed Term Project

The Peer Assessment's instructions invite to review the data quality of the GHCNM Weather Stations. This paper analyzes the data quality of the 4 Costa Rica's weather stations include in that model. I choose 4 variables that are vital to analyze the quality and quantity of data to ensure the credibility and validity of the results. All data were obtained in the period 1950 - 2013 and with the option: "data only".

Variable No. 1 Geographic Location:

The stations aren't distributed nationwide, 2 are in the capital, 1 on the Atlantic side and another on the Pacific slope. This leaves out other areas with different climates and data vital to have a representative analysis of the country. See Figure No. 1.

Variable No. 2 Periods of records:

All stations have records of different periods. If an annual historical record is



Figura No. 1 Costa Rica's Weather Stations

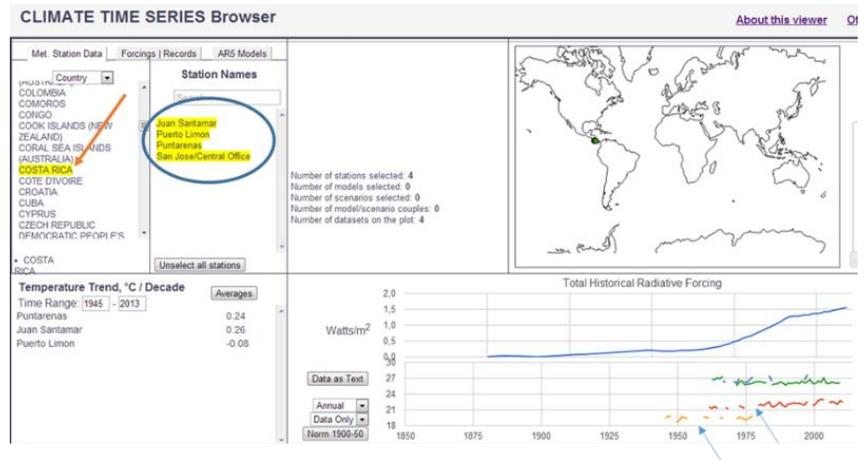
| Table No. 1 Periods of the records. | | | |
|-------------------------------------|-------|------|---------|
| Weather Stations | Years | | Period. |
| | Begin | End | |
| Central | 1945 | 1977 | 32 |
| Juan Santamaría | 1961 | 2010 | 49 |
| Puerto Limón | 1962 | 2009 | 47 |
| Puntarenas | 1967 | 1997 | 30 |

made, the Central Station (located in National Meteorological Institute) has data from 1945 to 1977, the Santamaría station (National Airport) from 1961 to 2010. The Puntarenas Station from 1967 to 1997 and the Limon Station from 1962-2009. See figure 2 and Table No. 1

Variable No. 3 Gaps information:

Figure No. 2 shows that the same station have several information gaps. For example, in the Central Station there are a gap between 1947 and 1949 and between 1952 and 1959. The Juan Santamaría station have a gap data between 1964 and 1967 and between 1979 and 1974.

Figura No. 2 Annual data of the Weather stations



<http://climatemodels.uchicago.edu/timeseries/#EqTBBB>

Variable No. 4 Validity of data:

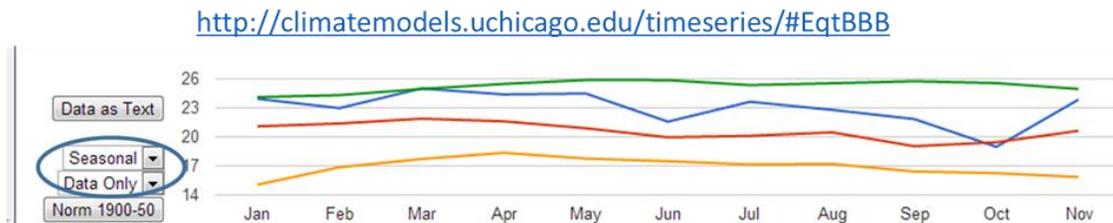
According with the National Meteorological Institute the Central Station has updated records from 1945. (Date of foundation of the Institute). But the model only includes information from 1945 to 1977. On the other hand, if a "decadal" historical record is done, there are records in the Juan Santamaria International Airport until 2015. Which can alter the decennial data if the system extrapolate data. See figure 3.

Figure No. 3 Averages option "decadal" .
Costa Rica Weather Stations.



If you make the “seasonal” averages the model shows continuous averages. In other words, the results obtained with partial data are presented like a general average. See figure 4

Figure No. 4 Averages option “seasonal” .
Costa Rica Weather Stations.



Conclusions:

- The stations included in Model GHCN Weather Stations and AR5 Models for Costa Rica, do not cover the whole country. There aren't a representative data of the country.
- Time series data are not continuous and have important gaps.
- Data from some stations are outdated.
- The records periods are not the same at all stations.
- Both the quality and the amount of data of the 4 stations can be substantially improved for more realistic results.
- The quality of information can lead to distortions for the whole country or alter results of national and regional analyzes (eg Central America).
- The amount of data is limited.
- It is possible that the quality and quantity of the Costa Rica data is the same in others countries.
- The Meteorological Institute of Costa Rica, has weather data for the whole country since 1945.
- There are an online digital base country covering the last 17 years. See http://www.imn.ac.cr/IMN/MainAdmin.aspx?_EVENTTARGET=LinksInfoClimatica