

## Analysis of Temperature collected in Vientiane (Lao PDR) from 1941 up to 2012

I have lived in Vientiane (Capital city of Lao PDR) since 2003 and I was curious to check how the data collection was made and what changes have occurred in the temperature pattern. I used the data of Vientiane station provided by <http://climatemodels.uchicago.edu/timeseries/#Cel> and add Vientiane.

Laos was under the French Colonial Empire, which then became involved in the Vietnam War and eventually came to belong in the Communist sphere. Penetration of “modern” technology and development has been very slow.

Data collection and recording started only in 1941 and the temperature data were not recorded regularly for many months of many years. It seems that data are missing because of the unstable political situation.

In the data file of the Vientiane Station @ Climatemodels.uchicago, I notice that the temperatures of the first period from 1941: first time data were collected till 1956, all the temperatures have the number 8 (##.#8) on the hundredth of centigrade, then in 1959, they have the number 1 (##.#1), then from 1961 – 1969 the number 5 (##.#5), then the number 3 (##.#3) from 1971 - 1974 and number 2 (##.#2) from 1975 till 2005... and then from 2005 until now there is no hundredth of centigrade recorded but only tenth of centigrade.

I am suspicious about the quality and accuracy of the data collection. Living in Lao PDR for the last 10 years I understand that precision and exactitude are not the top priorities of local people.

**Summary:** Data collection for the Weather Station of Vientiane (Lao PDR) seems less than perfect but if we consider that “mistakes” were evenly spread before and after the cutting point, 1973/1974, comparison of those data may bring us information about Climate Change in Lao PDR.

<http://climatemodels.uchicago.edu/timeseries/#Cel> type Vientiane

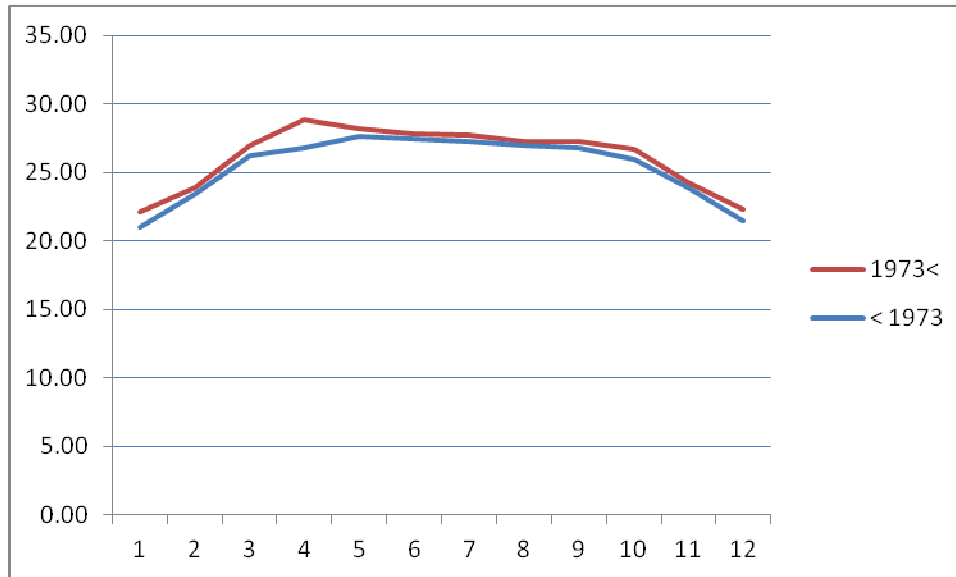
### Monthly Temperature recording:

Months	< 1973	1974<	1973-1974	
1	21.04	22.13	1.09	0.39
2	23.44	23.91	0.47	-0.24
3	26.20	27.02	0.82	0.12
4	26.82	28.80	1.98	1.28
5	27.65	28.21	0.56	-0.14
6	27.45	27.80	0.35	-0.35
7	27.29	27.73	0.44	-0.26
8	26.98	27.23	0.26	-0.44
9	26.76	27.27	0.51	-0.19
10	25.99	26.67	0.68	-0.02

11	23.85	24.27	0.42	-0.28
12	21.49	22.31	0.82	0.12
Total	25.41°C	26.12°C	8.41	0.70°C

According to the table the difference between 1941 and 2012 is + 0.20°C

According to calculation, the daily average temperature before 1973 was 25.41°C (around 27 years of data collected)



The daily average temperature after 1973 was 26.12°C (around 27 years of data collected)

The average monthly difference between the two periods of this study [1941 - 1973] and the period [1974 – 2012] show an increase temperature of by months + 0.70°C

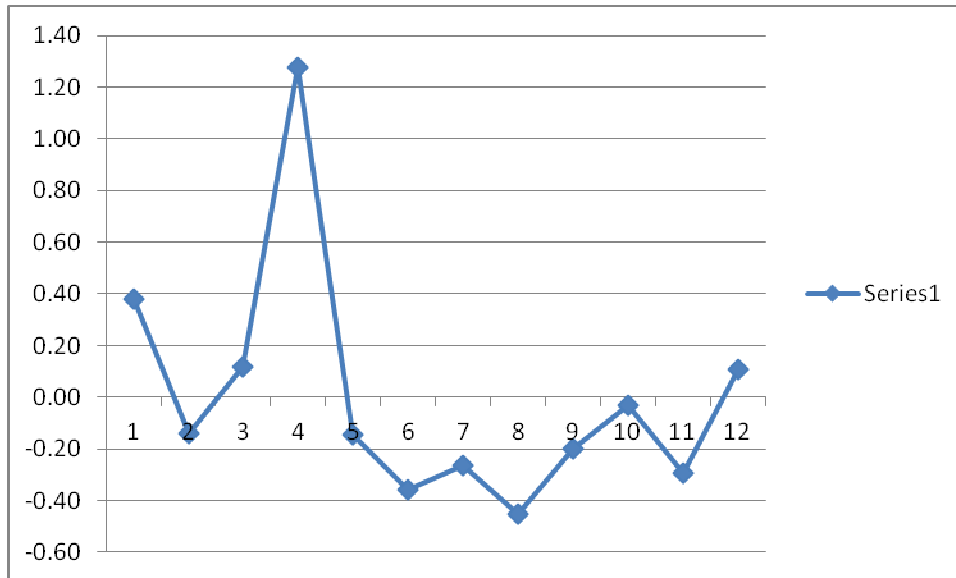
I have identified that four (4) months have an increase temperature higher than average temperature:

December: +0.12°C

January: + 0.39°C

Mars: +0.12°C

April: +1.28°C



Months of the year compare to the mean against the average of the year (+0.70°C) before 1973 and after

**Confirmation:** "The average temperature of the Earth's surface increased by about 1.4 F (0.8°C) over the past 100 years, with about 1.0 °F (0.6°C) of this warming occurring over just the past three decades" ([America's Climate Choices](#). Washington, D.C.: The National Academies Press. 2011. p. 15. [ISBN 978-0-309-14585-5](#).) which could be compared with the 0.7 C increase per month of the weather station of Vientiane since 1974

**Temperature trend, °C by decade:**

1. 1941 – 1951: - 0.66°C
2. 1951 – 1961: - 0.02°C
3. 1961 – 1971: 0.65°C
4. 1971 – 1981: 0.00°C
5. 1981 – 1991: NA
6. 1991 – 2001: 0.14°C
7. 2001 – 2011: 0.48°C
8. 1941 – 2011: 0.20°C

The data collated by decade show also an increase of the temperatures over the time with a decrease from the period 1941 -1961, and a steady increase from 1991 till 2011. The period from 1961 to 1991 may show unreliable data collection.

**Conclusion 1:** The hottest four months recorded at the Vientiane weather station belong to the so called cooler season, before the rainy season... Thus we can estimate that the cold season is less cool than before and are affected by the Climate Change, one of the identified impact is the pest infestation which is not stopped anymore during the colder season. The second aspect of the Climate Change is that the beginning of the planting season could change erratically with it the period of crop.

**Conclusion 2:** uneven temperature collection may show a real aspect of climate change but it is advisable to apply international standard to help Vientiane Weather station to produce data useful to combat Climate Change