Atmospheric temperature study on the South pole, since 2018 January to 2019 December.

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Abstract— **There are diverse and contradictory opinions about of the existence of the global warming. Is not easy to find papers that explain with enough detail, how to measure the atmospheric temperature that support this statement.**

In this context, the south pole is a one the most marked geographical areas, as harmed by global warming. Nevertheless, our last research work[1] showed that during the year 2018, the Antartica cooled almost 1°C.

In this situation, and in order to clarify this question, we decided to undertake our own research work. We had used as data source, the value collected by Amundsen-Scott sounding. This base is the most near to the geographic south pole. All its measurements are available in the web site of Wyoming University.

With these data, we calculate the average temperature from the surface level to the mayor high level that arrive the sounding balloon. Each day, each month; since January 1 of 2018 to December 31 of 2019.

The result obtained from our study, cast doubt the existence of the atmospheric warm over the south pole.

***Index Terms*—south pole, atmospheric temperature, global warm.**

I. INTRODUCTION

The atmosphere is an open thermodynamics system, and it behaves like a mixture of ideal gases. For these reasons, it must application of law and principles of the thermodynamics and fluids mechanical when you want to study it.

Under this situation, the atmospheric air interchange heat with all universe, that it is a could calorific focus of the approximately 2.72K(-270,44°C). Of course, any place of the atmosphere is a mayor than the universe, and as there not exist adiabatic zone; all the atmospheric air emit continuously heat to universe; reason why it should cool dawn permanently. This fact unable us to doubt the possible existence of global warm.

For this question, the study was conducted in order to be able to make it clear this situation; choosing us the south pole us an icon and target of the research, since it is one most considered study sites on this subject.

In order to get this objective, we had used the data sounding of the Amundsen-Scott meteorology station. Its measure value are available on the web site of Wyoming university(http://weather.uwyo.edu/upperair/sounding.html)

Temperatures over the atmosphere of the south pole were processed daily, each mount, since January 2018 to December 2019 inclusive.

II. OBJETIVES

In order to get the expected results, we had worked under the next objectives:

_ To can to determinate the trend of the temperature behavior of the atmosphere over south pole.

_ Verify the possibility of the global warm existence, or climate change in the south pole.

III. METODOLOGY

With the sounding temperature data of Amundsen-Scott meteorology station, obtained from the web site of the Wyoming university (http://weather.uwyo.edu/upperair/sounding.html), we had studied the next values:

_ Temperature measured at surface level.

_ The tropopause temperature.

_ The vertical average temperature from de surface to 100 milibars level.

_ The vertical average temperature from de surface to maximal high that reached the balloon on its rise.

We had processed these data each day of each months, since January 1 of 2018 to December 31 of 2019. In order to obtain expected results, we order the value on the Excel spreadsheets that are showed in the figure 1 and 2.

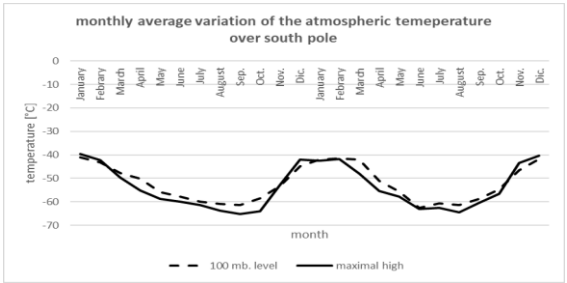

Figure 1. Graphics that show the behavior of the monthly average of the temperature of the atmosphere over south pole.

[1] Pérez Raúl C. *"Calentamiento Global ¿Mito o Realidad?."* Editorial Académica Española. AV Akademikerverlag GmbH & Co. KG. (ISBN 978-620-0-01476-4). Año 2019.

Into the figure 2, it is showed the Excel spreadsheet with the temperature values at different highs over the south pole to October 2019.

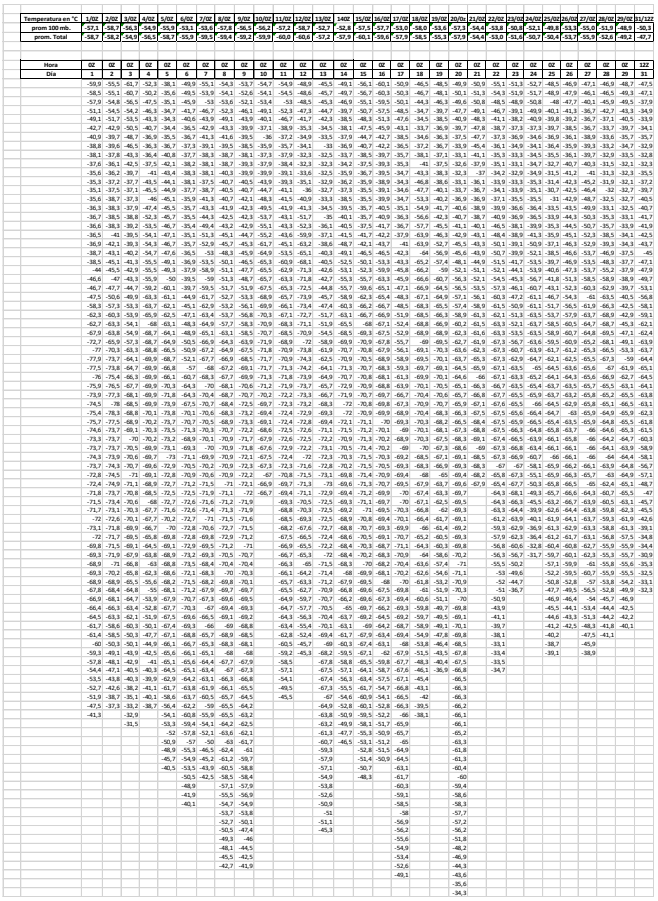

Figure 2. Excel spreadsheet with de temperature data of the Amundsen-Scott sounding over the south pole to October 2019.

IV. RESULTS

The results obtained of our analysis, are shown in synthetic form in the next figures:

The 100 milibars level.

In the figure 3 it can be seen the behavior of the average temperature of the atmosphere on the south pole, calculate from surface to 100 mb. level, for two years (January 2018 to December 2019).

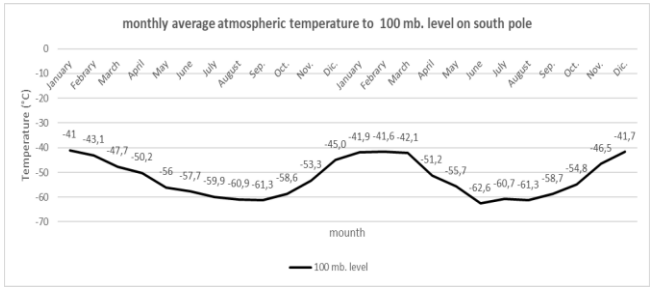

Figure 3. Behavior of the average atmospheric temperature over the south pole, calculate from surface to 100 mb. level.

As you can see in the graph of the figure 3; the important results are:

1. The behavior of the average atmospheric temperature over the south pole present oscillating periods; of course, as it should be, showing warm-up in summer and winter cooling.

2. Over two years of study, it can be seen, that the maximal values of high and low atmospheric temperature were approximately the same.

3. The previous results and the graph of figure 3 show that, on average, no exist evidence of an atmospheric warm over de south pole, conversely, it seems that the most correct thing is to talk about a steady thermal equilibrium.

Temperature value on surface

Other important value to study was the temperature on surface. In the graphic of figure 4, we can to observer the behavior of this magnitude, compared to the average temperature of the atmospheric air over south pole.

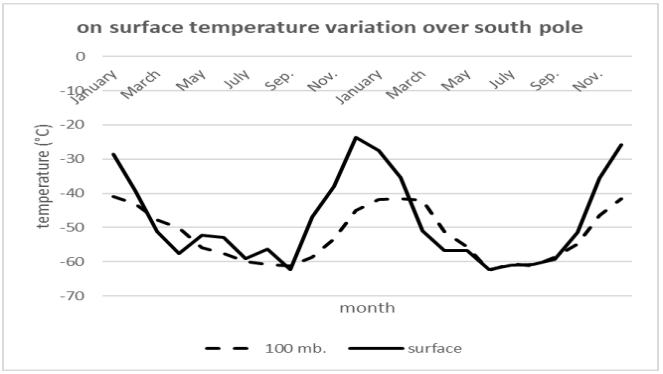

Figure 4. Graphic of the behavior of the surface temperature over the south pole. It is compared with the graphic of the average temperature value of atmospheric air until 100 mb. level

Observing the graphics, interesting questions arise:

_ These values present the same oscillation period, with summer warm and cooling winter.

_ The warm amplitude on surface present values much greater than the average temperature until 100 mb. level, but the cooling values amplitude are approximately equal.

The tropopause temperature

Also, it is interesting of study the tropopause temperature on the south pole. Its behavior is showed in the graphic of the figure 5.

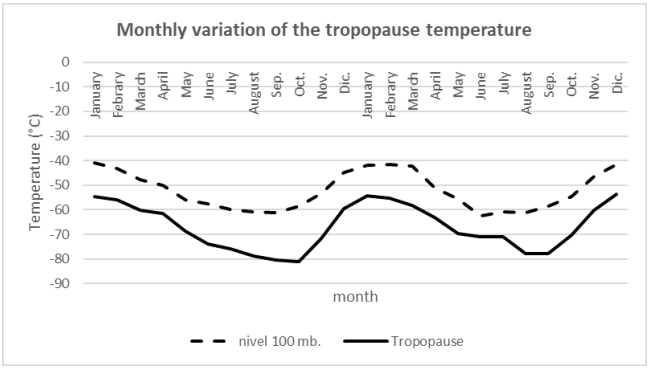

Figure 5. Figure 4. Graphic of the behavior of the tropopause temperature over the south pole. It is compared with the graphic of the average temperature value of atmospheric air until 100 mb. level

As in all previous cases, we can to observer also a oscillate behavior of the south pole tropopause temperature, with higher temperature in the summer and major cooling in winter. The temperature value spread between the tropopause and the average value until 100 mb. is big, being the coldest troposphere.

IV. CONCLUSIONS

The table 1 show the result of the calculi of all monthly average temperature value in our study, since January 2018 to December 2019.

Year	2018	Temperature (°C)										
month	January	Febrary	March	April	May	June	July	August	Sep.	Oct.	Nov.	Dic.
100 mb.	-41	-43,1	-47,7	-50,2	-56	-57,7	-59,9	-60,9	-61,3	-58,6	-53,3	-45,0
h max.	-39,7	-42,3	-49,7	-55,2	-58,8	-60	-61,4	-63,8	-65,2	-64,0	-52,8	-42,0
surface	-28,5	-39,3	-51,2	-57,5	-52,3	-52,9	-59,2	-56,4	-62,4	-46,9	-37,9	-23,7
Tropopause	-54,7	-55,9	-60,1	-61,5	-68,7	-73,8	-75,8	-78,8	-80,5	-81,2	-71,8	-59,6
	2019	Temperature (°C)										
	January	Febrary	March	April	May	June	July	August	Sep.	Oct.	Nov.	Dic.
	-41,9	-41,6	-42,1	-51,2	-55,7	-62,6	-60,7	-61,3	-58,7	-54,8	-46,5	-41,7
	-42,4	-41,8	-47,9	-55,5	-57,8	-63,0	-62,5	-64,4	-60,4	-56,5	-43,5	-40,3
	-27,5	-35,5	-50,9	-56,8	-56,8	-62,3	-61,1	-60,8	-59,3	-51,5	-35,7	-25,7
	-54,3	-55,3	-58,3	-63,0	-69,8	-71,0	-71,0	-77,7	-77,7	-70,3	-60,3	-53,8

Table 1. average temperature values over south pole during period January 2018 to December 2019.

So, it can be seen that:

1. The average atmospheric temperature over the south pole from surface to 100 milibars level, cooled 4°C the first year and 0,7°C during the two years of study.
2. The average temperature of the atmosphere calculate since surface of south pole to maximal high arrived at the sounding balloon, present a cooled of the 2,3°C during a first year, and 0,6°C throughout to years analyzed.
3. Also, it can be observed that the monthly average temperature of the surface warm a one Celsius degree on the first year, and 2,8°C during the two years.
4. When the tropopause temperature is observed, it can be appreciated that, the first year it had cooled 4,9°C, and during all two years it was warm 0,9°C.

Es important distinguish that the tropopause and on surface temperature values do not are a global parameter, only represent the data of a single level of the atmospheric temperature; conversely, the average temperature values from on surface to 100 mb. level or maximal high are the global parameters. So, the temperature global parameters show a global cooling; whereas that the singles level present a warm process.

This situation indicate that, we have to be careful when stating that about the existence or not of the global warm; the form of how and where the temperature data is taken becomes main.

These results obtained do not even presume existence of a warming over the south pole.

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