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**AT THE TRUE COLD POLE IN ANTARCTICA, THE MINIMUM AIR
TEMPERATURE AT THE EARTH'S SURFACE CAN BE FROM -100 °C
TO -130 °C**

Annotation. A hypothesis is advanced that the location of the true Pole of Cold of the Southern Hemisphere, and hence the coldest place of the Earth in natural nature, has not yet been found. Using the method of analogy, the maximum, average and minimum air temperatures at the earth's surface are calculated, which can be fixed at the true Pole of Cold in Antarctica.

Keywords: Pole of Cold, minimum air temperature, Antarctica

Source facts

1. In the Northern Hemisphere, the North Magnetic Pole is located in the area of the Canadian island of Victoria, and the Cold Pole of the Northern Hemisphere is located in Verkhoyansk; the distance between these two points is more than four thousand kilometers.

2. The number of meteorological observation points in the Northern Hemisphere in the Arctic Circle is very large - there are many hundreds of them; while the number of bases deep in Antarctica capable of functioning in winter is currently only a few.

Statement of a question

At present, it is generally accepted that the cold pole of the Southern Hemisphere is located in the region of the Russian (formerly Soviet) Vostok station, located near the south magnetic pole. The minimum air temperature near the earth's surface, recorded at this point, is -89.2 ° C (3), which is much lower than the minimum temperature noted at the cold pole of the Northern Hemisphere (in the region of Verkhoyansk or Oymyakon) and equal to -68 ° C (3); thus, the cold pole of the southern hemisphere turns out to be the cold pole of the entire earth.

Is the coldest spot in the Southern Hemisphere really in the area the magnetic south pole?

Based on fact № 1, the answer to this question is "no", that is, the coldest point of the Earth's southern hemisphere should not be in the region of the south magnetic pole.

True Pole of Cold in the Southern Hemisphere

The True Cold Pole of the Southern Hemisphere is the point on the Earth's surface where, in reality, there was the lowest temperature in the entire Southern Hemisphere of the Earth.

In connection with the introduction of the concept of the true cold pole of the Southern Hemisphere, the question arises: was the temperature at the true cold pole of the Southern Hemisphere measured by scientists?

Due to the fact that the southern magnetic pole of the Earth is taken as the cold pole of the Southern Hemisphere, the answer to this question is "no", that is, the air temperature in the coldest point of the Southern Hemisphere has not yet been measured and recorded by scientists.

Why did it happen? The answer is Initial Fact № 2: Too few weather stations are located in Antarctica to determine the location of the Earth's true cold pole by now.

Hypothesis

The point at which the minimum temperature of the southern hemisphere of the Earth should be fixed has not yet been identified and, accordingly, it is not known what the minimum air temperature can be in natural conditions on Earth.

Potential confirmation of the hypothesis [3]

№ 1. According to calculations, the minimum temperature at the so-called "pole of inaccessibility" should reach -91.8°C .

№ 2. US scientists, according to the NASA satellite, set the temperature at -93.2°C .

Both of these temperature measurements show that in Antarctica, the air temperature at the earth's surface can potentially be recorded lower than at the currently accepted cold pole of -89.2°C .

Where to look for the true cold pole of the Southern Hemisphere?

Let's draw an analogy with the Northern Hemisphere: the north pole of cold is located much east further south of the north magnetic pole, therefore, the true cold pole

of the Southern Hemisphere must be sought much west of the Vostok station. Approximately in this area is the pole of inaccessibility - and it is in this area that scientists expect to find the coldest place in Antarctica [3].

What could be the climate at the true cold pole of the Southern Hemisphere?

Let's calculate the minimum temperatures in the area of the true cold pole of the Southern Hemisphere, based on the following analogy: the air temperature at the true cold pole of the Southern Hemisphere is as much lower than the temperature in the area of the South Magnetic Pole, as much as the air temperature at the Cold Pole of the Northern Hemisphere is lower than the temperature in the area of the North Magnetic Pole.

One of the closest weather stations to the North Magnetic Pole is the US Thule Air Base. But this place is located on the seashore, so the climate there is maritime, and not continental, as in "Vostok", therefore, for a correct analogy, you should choose a meteorological station with a continental climate located near the north magnetic pole. The most promising settlement from this point of view is the Canadian city of Yellowknife (Rus. Йеллоунайф). Indeed, in this city the minimum recorded temperature is -51.2°C , while in Tula it is -43°C .

So, we have the initial data: the climate in the region of Verkhoyansk (the true cold pole of the Northern Hemisphere), the climate in the Yellowknife area (near the magnetic north pole) and the climate in the region of the Vostok station (the south magnetic pole). Taking into account the fact that all calculations are approximate, we will take the initial air temperatures with an accuracy of whole degrees Celsius.

Calculation formula:

$$T(\text{cold pole of the Southern Hemisphere}) = T(\text{Vostok station}) + T(\text{Verkhoyansk}) - T(\text{Yellowknife}).$$

We also take into account the order of the seasons when adding up: in particular, winter in the southern hemisphere lasts from June to August, and in the northern hemisphere from December to February.

Calculation examples:

№ 1. Average monthly air temperature in the first month of summer.

T (early summer, December, true cold pole of the Southern Hemisphere) = -32 (early summer, December, "East") + 13 (early summer, June, Verkhoyansk) - 14 (early summer, June, Yellowknife) = -33 ° C.

№ 2. The minimum air temperature in the second month of autumn.

T (mid-autumn, April, true cold pole of the Southern Hemisphere) = -86 (mid-autumn, April, "East") + (-49) (mid-autumn, October, Verkhoyansk) - (-29) (mid-autumn, October, Yellowknife) = -86-49 + 29 = -106 ° C.

Table 1. Air temperature near the earth's surface at Vostok station, °C [2]

	January	February	March	April	May	June	July	August	September	October	November	December	Year
Max	-14	-21	-30	-33	-38	-33	-34	-35	-34	-34	-24	-14	-14
Average	-32	-44	-58	-65	-66	-65	-67	-68	-66	-57	-43	-32	-55
Min	-56	-64	-75	-86	-81	-84	-89	-85	-86	-76	-64	-50	-89

Table 2. Air temperature near the surface of the earth in Verkhoyansk, °C [1]

	January	February	March	April	May	June	July	August	September	October	November	December	Year
Max	-10	-6	5	14	28	34	37	34	25	15	1	-5	37
Average	-45	-42	-30	-12	4	13	17	12	3	-15	-35	-43	-15
Min	-68	-68	-60	-57	-34	-8	-3	-10	-22	-49	-57	-65	-68

Table 3. Air temperature near the earth's surface in Yellowknife, °C [4]

	January	February	March	April	May	June	July	August	September	October	November	December	Year
Max	3	6	9	20	26	30	33	31	26	31	8	3	33
Average	-27	-23	-17	-5	6	14	17	14	7	-2	-14	-24	-5
Min	-51	-51	-43	-41	-23	-4	1	-1	-10	-29	-44	-48	-51

Table 4. Estimated air temperature near the earth's surface at the true cold pole of the Southern Hemisphere, °C

	January	February	March	April	May	June	July	August	September	October	November	December	Year
Max	-10	-18	-31	-49	-45	-41	-47	-47	-38	-40	-22	-10	-10
Average	-32	-46	-62	-78	-87	-84	-85	-87	-79	-64	-45	-33	-65
Min	-60	-73	-87	-106	-94	-101	-106	-102	-103	-92	-75	-54	-106

The minimum temperature at the cold pole of the Southern Hemisphere in April is surprising: judging by the data, it is associated with the lack of annual observation cycles at Vostok station, because according to the figures that are now, it turns out that the minimum temperature in April (mid-autumn in the Southern Hemisphere) can be as low (-86 ° C) as in winter (-84 ° C, -89 ° C, -85 ° C), and even at the beginning of spring (-86 ° C), which is illogical. For example, in Verkhoyansk and Yellowknife, the minimum air temperatures are in October (mid-autumn in the Northern Hemisphere) than in winter:

Verkhoyansk: $-68\text{ ° C (January)} - (-49\text{ ° C (October)}) = -19\text{ ° C}$.

Yellowknife: $-51\text{ ° C (January)} - (-29\text{ ° C (October)}) = -22\text{ ° C}$.

Thus, we can expect that the winter minimum air temperature at the true cold pole may be 22 ° C lower than in April (mid-autumn of the Southern Hemisphere), that is, equal to: $-106 + (-22) = -128\text{ ° C}$. Such a low temperature can probably be recorded with more than a hundred years of observation time - this assumption is due to the fact that the lowest air temperatures near the earth's surface in Verkhoyansk were recorded about a hundred years ago: the lows of January and February - in 1892, and December - in 1902 (1).

Conclusions

1. The location of the Vostok station in Antarctica does not correspond to the location of the true cold pole of the southern hemisphere of the Earth.

2. The location of the true cold pole of the southern hemisphere of the Earth has not yet been found.

3. At the true cold pole of the Southern Hemisphere, the minimum air temperature at the surface can be recorded from -100°C to -130°C .

4. To fix the lowest air temperature near the earth's surface at the true cold pole in Antarctica requires at least a hundred years of observations.

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