



2023“GLOBE Cianjin Atmospheric Observation Mission” Annual Topic

《2024 International Virtual Science Symposium Report》



Temperature Observation & Comparison of the Results in Kaohsiung and Mexico City

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Summary

Our report focused on the temperature change between tropical monsoon climate type Kaohsiung, Taiwan (Plain terrain) and tropical rainforest climate type Mexico City, Mexico (Highland terrain, the height is 2274m) from year to year, and then analyzed through the four-year average temperature data of the globe and the Taiwan Meteorological Bureau website. Finally, it is found that the average temperature of the two places showed an upward trend from 2018 to 2020. In 2021, due to the La Niña phenomenon, the two places showed different trends, but still showed the crisis of global warming.

keyword : Temperature changes , global warming

Research questions

Our research question is what the temperature changes are in Kaohsiung, Taiwan and Mexico City, Mexico 2018-2022. This question can also be inferred from the changing trend of global warming.

Research methods

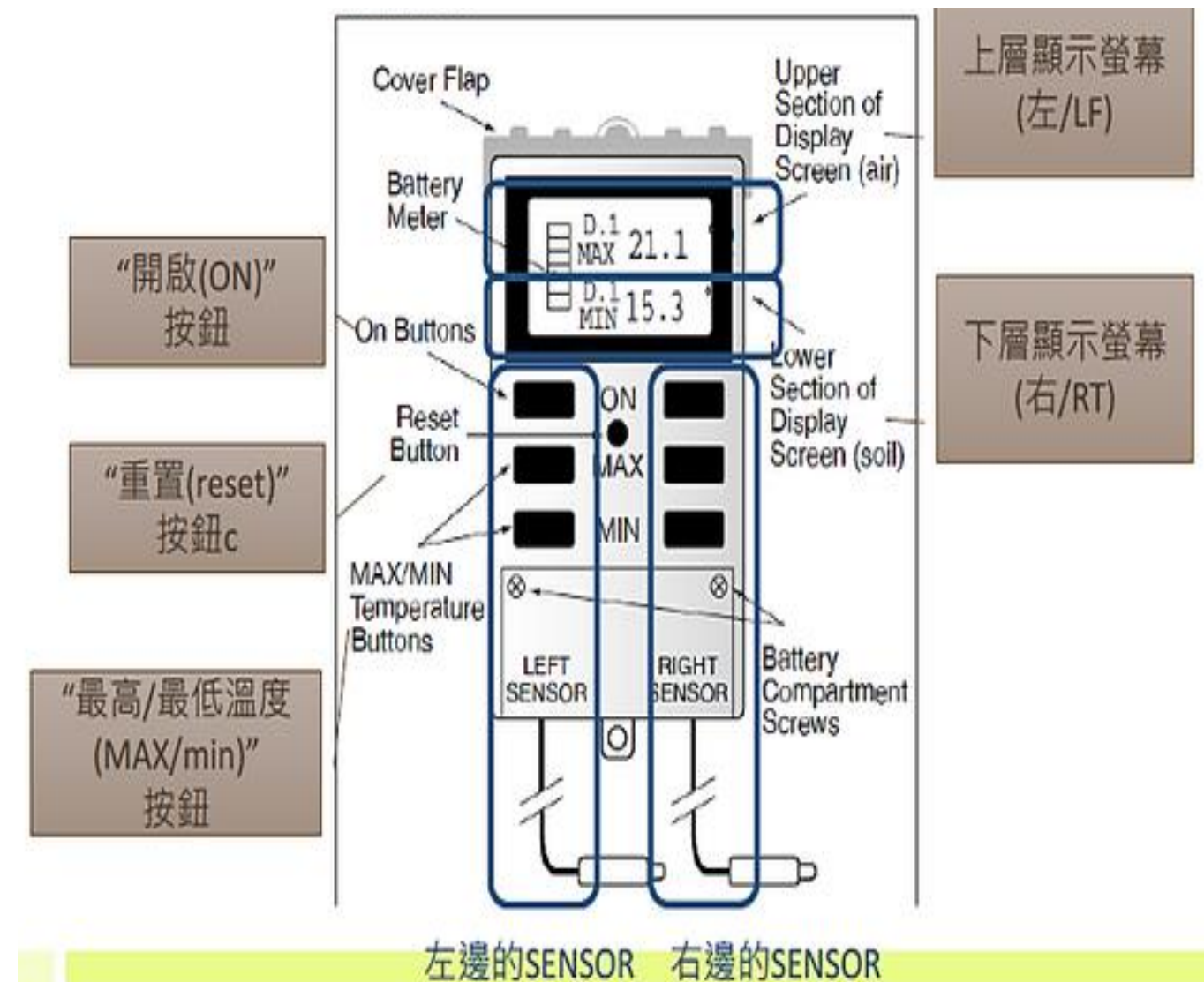
Measuring instruments:



picture 1

Multi-day electronic maximum/minimum thermometer

Measurement operation:



Picture 2

Internal structure of multi-day electronic maximum/minimum thermometer (Reference report sample P18)

Station information 1 (Kaohsiung, Taiwan)

1.

Site Information

Site ID	104218
Name	Cianjin 1
Latitude	22.630026°
Longitude	120.291204°
Elevation	6.8m
Location Source	other

Picture 3

Kaohsiung station information

2.

Climate :Tropical monsoon climate

Features :

1. High temperature all year round

2. The monsoon is pronounced.

Summer: southwest monsoon

Winter: Northeast monsoon

3. The dry and rainy season is obvious (Winter and early spring are dry due to cold snaps. Late spring and summer are rainy seasons due to rainy and typhoon influences.)

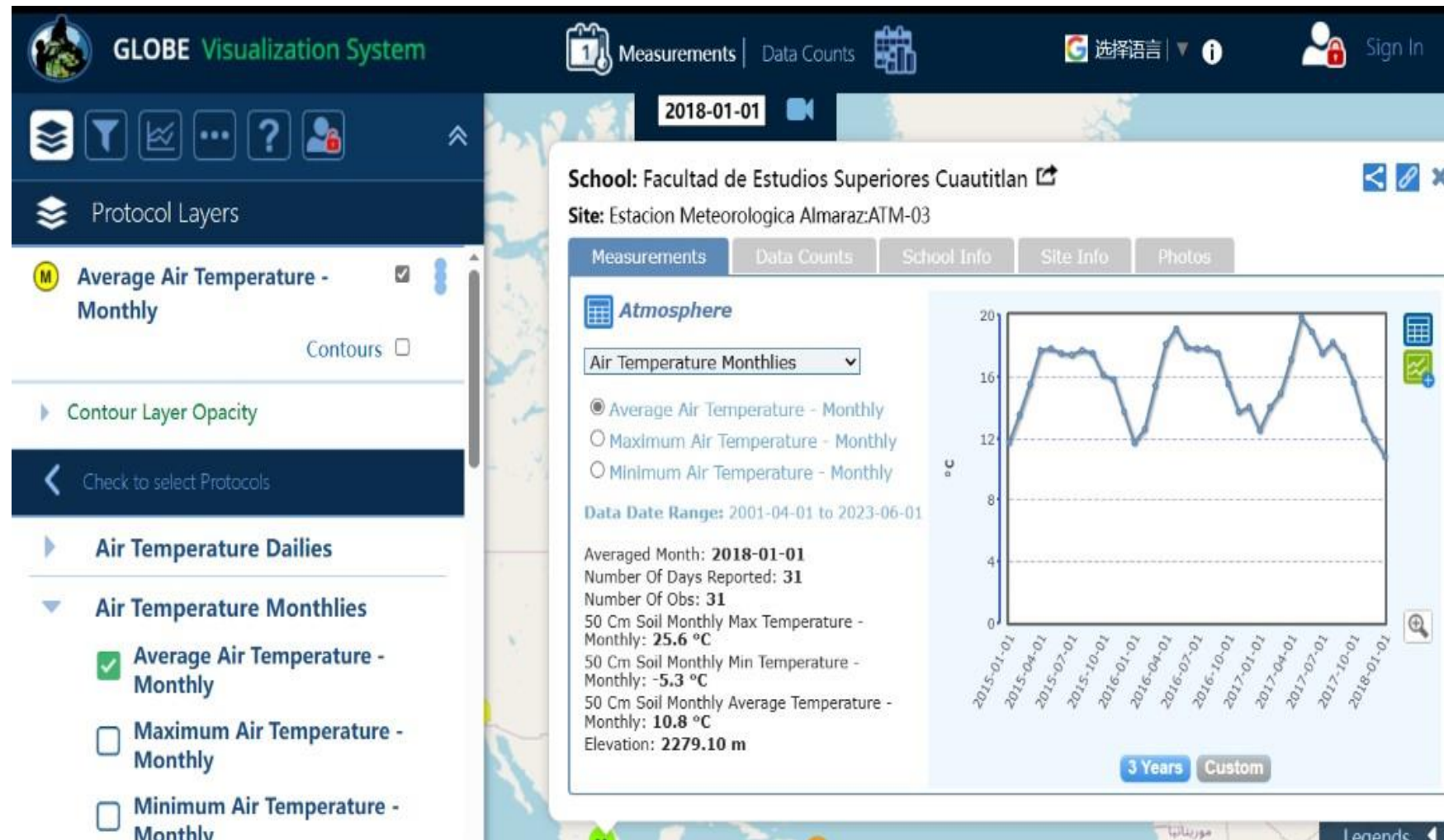
3.

Plain terrain

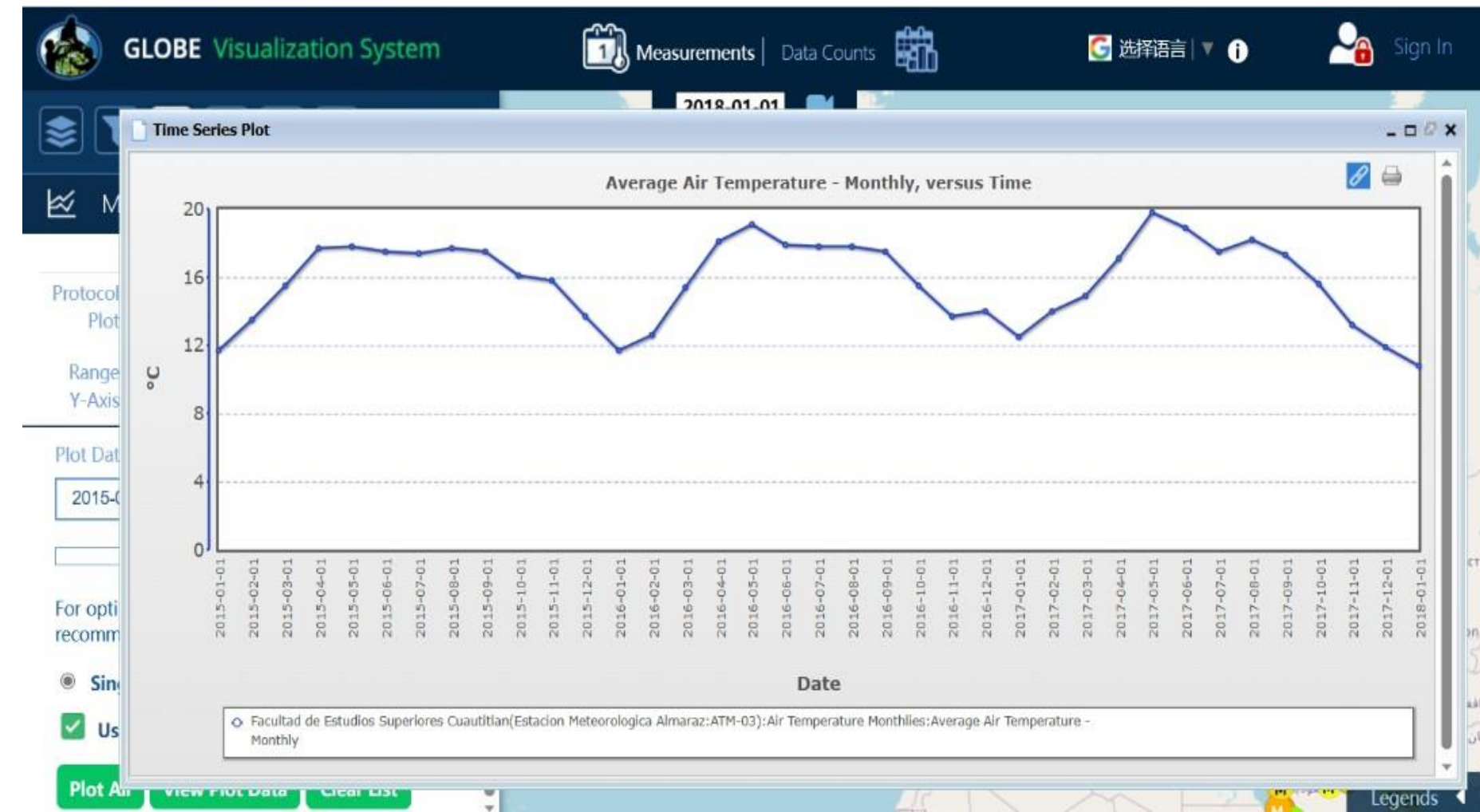
(The average temperature is about 24 degrees

Celsius.)

Globe Website screenshots :



Picture 4 Screenshot from the globe website 1



Picture 5 Screenshot from the globe website 2

Statistical chart of temperature

A. Observation results in Kaohsiung, Taiwan

1. (1) This can be seen from the highest temperature (red part) in Figure 4.

2018(May)~2019(May) up 0.4°C

2019(May)~2020(May) up 1°C

2020(June)~2021(May) down 1.4 °C

Rise first and then fall .

(2) This can be seen from the lowest temperature (blue part) in Figure 4.

2018(February)~2019(November) up2.4 °C

2019(November)~2020(January) down 1.4 °C

2020(January)~2021(January) down 2.1°C

It also showed a first rise and then a fall.

2. Annual temperature difference part :

year	2018	2019	2020	2021
Annual temperature difference(°C)	9.2	7.2	9.6	10.3

B. Analysis and discussion of observations



Picture 6 Taiwan Kaohsiung 2018~2022 temperature chart

3. According to the above two points, it can be found that Taiwan has a large degree of fluctuation in temperature difference regardless of the highest temperature/lowest temperature / annual temperature due to the influence of climate type.

Station information 2 (Mexico City, Mexico)

1.

Name	<u>Facultad de Estudios Superiores Cuautitlan</u>
Latitude	19.6885°
Longitude	-99.1892°
Elevation	2274.0m

Picture 7 Mexico City station information

3. Climate: Tropical rainforest climate

Features:

- (1) High temperature and rainy weather throughout the year
- (2) Small temperature difference between day and night (about 7 °C)

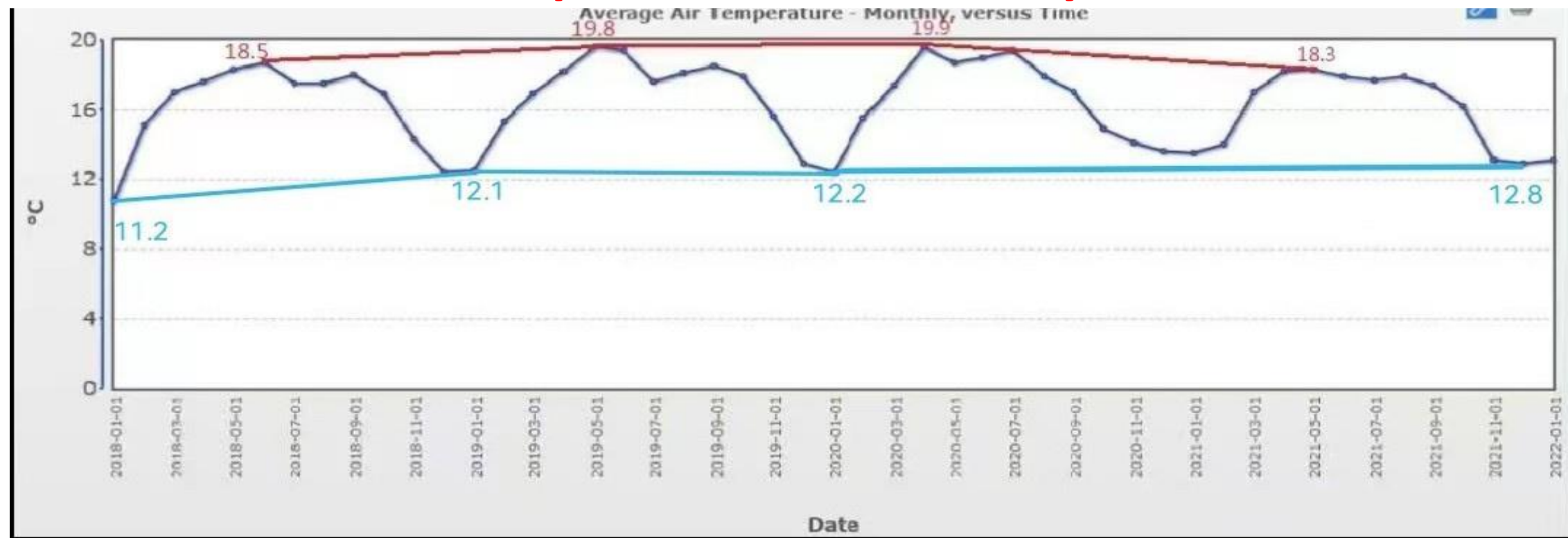
4. Plateau terrain (Average temperature is about 15 °C.)

2.



Picture 8 Location of Kaohsiung, Taiwan and Mexico City, Mexico

A. Statistical Map of Mexico City Observation Results



Picture 9

Mexico City 2018-2022 Temperature Chart

B. Analysis and Discussion of Observation Results

1. (1) From the highest temperature in Figure 5 (red part), (2) From the lowest temperature in Figure 5 (blue part), we can see that

2018 (June) ~2019 (May) up 1.3 °C ,
 2019 (May) ~2020 (April) up 0.1 °C
 2020 (April) ~2021 (May) down 1.6 °C
 Rise first and then fall.

we can see that

2018 (January) ~2019 (January) up 0.9 °C
 2019 (January) ~2020 (January) down 0.1 °C
 2020 (January) ~2021 (December) up 0.6 °C
 showing continuous rise.

2. annual temperature difference :

year	2018	2019	2020	2021
Annual temperature difference(°C)	7.3	7.7	7.7	5.5

3. Based on the above two points, it can be found that the highest temperature in Mexico City is generally around 19 °C due to the influence of the plateau topography, and the lowest temperature is generally around 12 °C, and the fluctuation of the highest/lowest temperature/annual temperature difference due to the climate type is small.

Comparative Analysis and Discussion of Observation Results of Two Measuring Stations

According to Figure 4, Figure 7 and the highest temperature part in the first discussion of Page 6 and Page 8, it can be known that Taiwan Kaohsiung and Mexico City both rose first and then fell. The reason for the decline in 2020-2021 is that the La Niña phenomenon caused the global temperature to drop suddenly.

The lowest temperature part of the first discussion shows that Kaohsiung first rises and then falls, while Mexico City shows a continuous rise. The reason for the difference between the two is largely due to the climate type. Kaohsiung has a tropical monsoon climate. In winter, it will be affected by the continental cold air mass (cold current) blown by the northeast monsoon. However, Mexico City has a tropical rainforest climate. This climate phenomenon (cold current) does not appear in winter, so the trend of the minimum temperature of the two is different.

In the second discussion of Page 6 and Page 8, the annual temperature difference is different between the two. The main reason is the terrain. Although both are located in the tropics, the annual temperature difference in Kaohsiung is larger than that in Mexico City because the annual temperature difference in the plain is larger than that in the plateau.

Whether it is the sudden drop in global temperature caused by the La Nina phenomenon or the different climates and terrain types in various places, it does not mean that global warming has stopped or eased. We still need to work hard to reduce the production of greenhouse gases.

☉The La Nina phenomenon is also known as the anti-El Niño phenomenon, that is, the "Eastern Pacific Cooling Phase", but it will not affect global warming. When it occurs, the climate will be abnormal, and some areas will be abnormally dry and cold.

Bibliography/Citation

1. Globe official website

<https://www.globe.gov/fr/home>

2. Official website of Taiwan Meteorological Administration

<https://www.cwb.gov.tw/V8/C/>

3. (1) <https://www.tianqi.com/news/300414.html>

(2) La Nina Weather Meteorological Sources : <https://zh.wikipedia.org/zh-cn/拉尼娜现象>

Badge Description

I am a collaborator



The researchers ZHENG,RU-JIE and CHIEN, HSIN-YI from Cianjin junior high school completed this report together. ZHENG,RU-JIE is responsible for making and drawing charts. CHIEN, HSIN-YI is responsible for analyzing the charts and writing the content of the charts.

I have influence



Through our own research questions, we understand the temperature phenomena in Taiwan and other countries, so that viewers can also understand the crisis of global warming.

I am a data scientist



We used Internet data and self-observation data to analyze the data of these four years to solve our research questions.