

Is the earth sick?

Team 1 Blue Whale

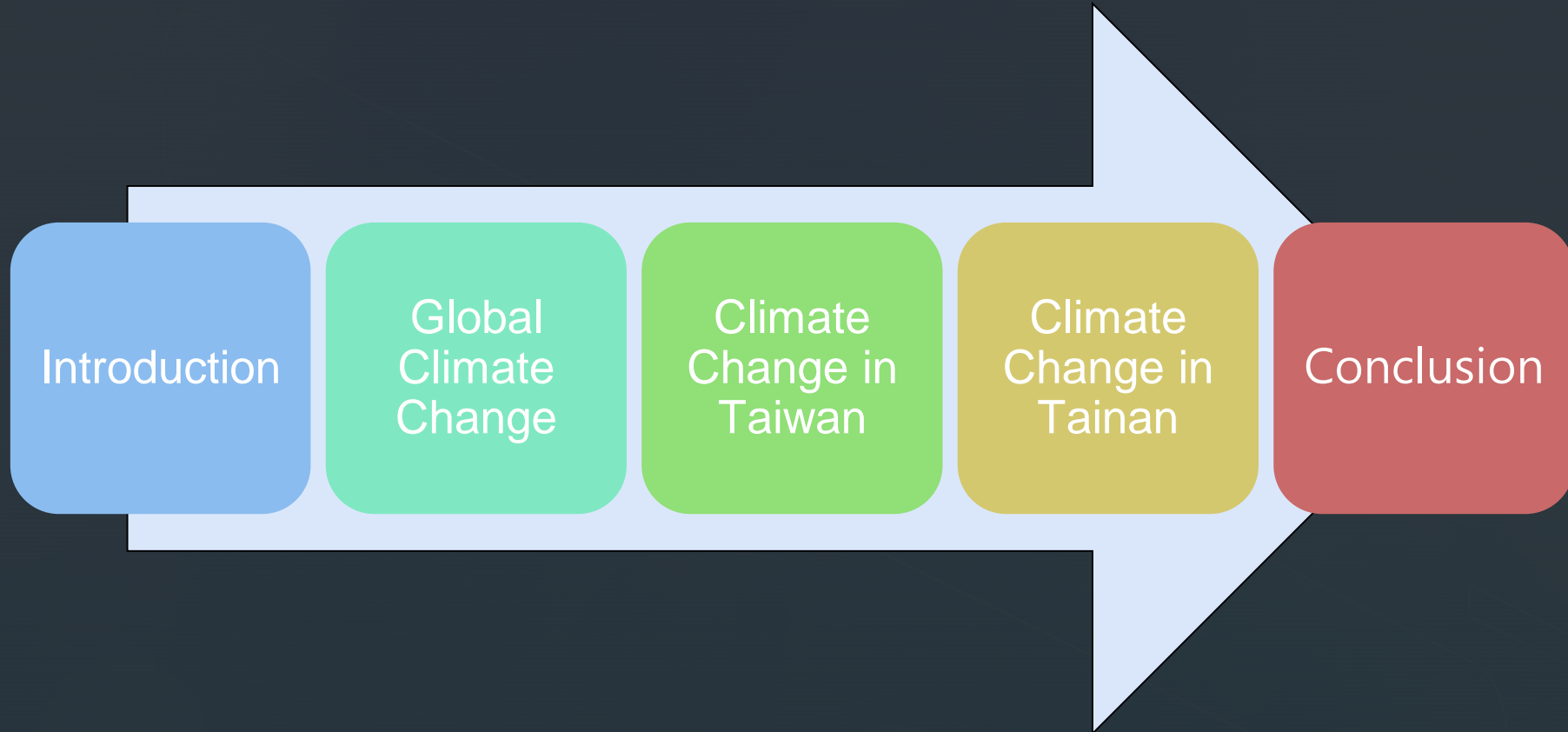
Captain: Humi

Vice Captain: Kiki

Member: Ella, Debby, Lisa, Rebeca,
Lily, Aaron



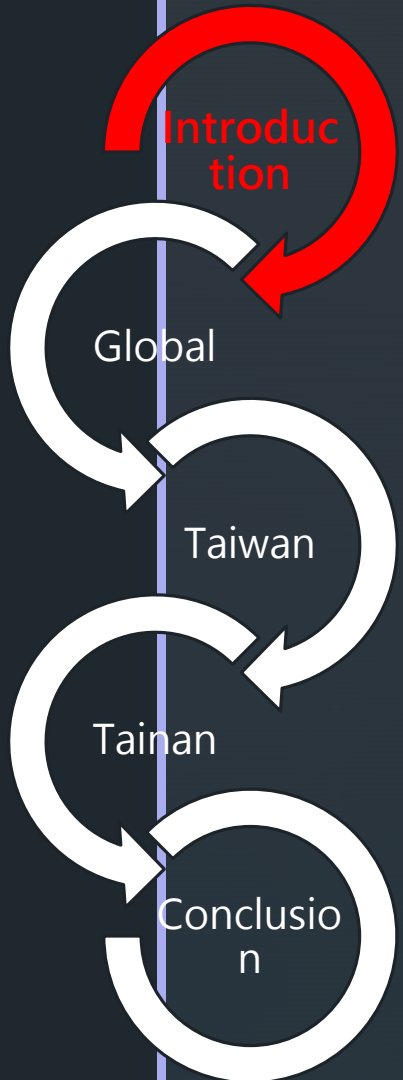
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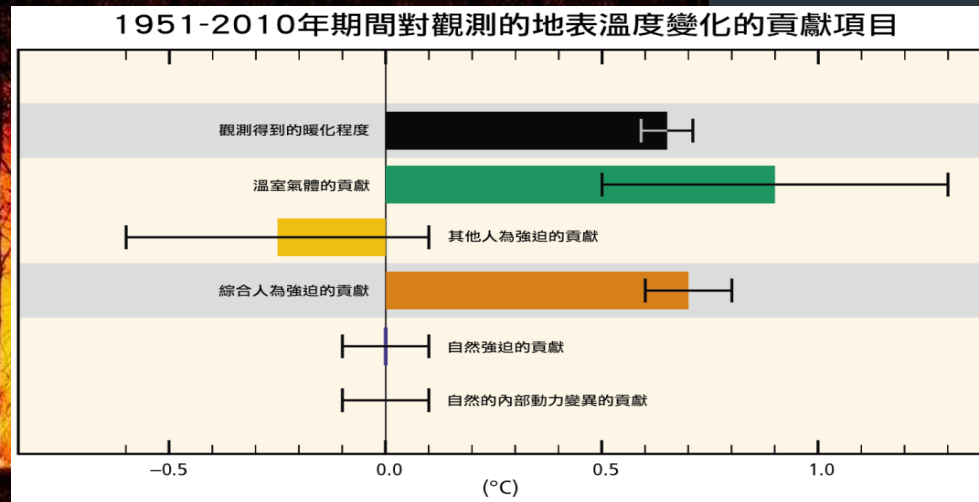
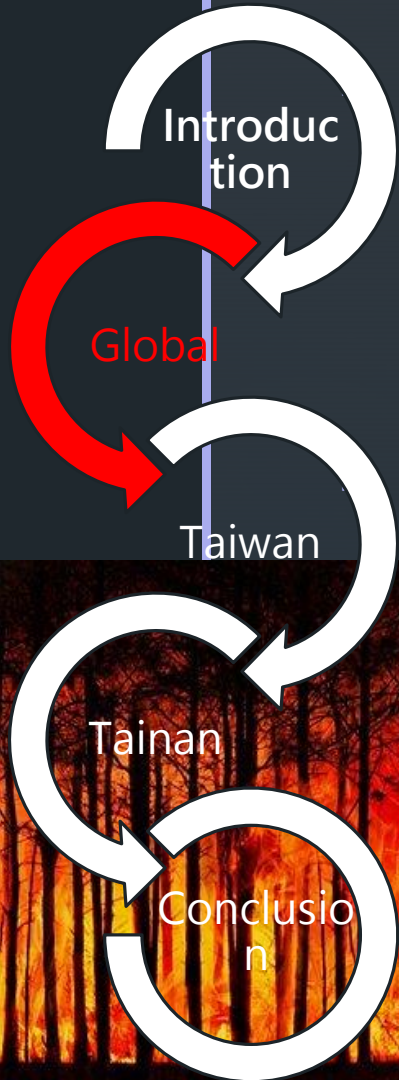
- Global warming is a phenomenon in which the average temperature of the land or sea surface increases over time.
- In recent years, the term "global warming" has gradually been replaced by "climate change", emphasizing that climate change is not just a change in temperature.
- Many of the changes observed since 1950 have not occurred in decades to thousands of years. For example: warming of the atmosphere and ocean, reduction in snow and ice cover, rising sea levels, increasing concentrations of greenhouse gases.
- Insufficient water resources, food security, climate and other issues have resulted in the increase of refugees, economic deterioration, social and political contradictions and tensions and brought about turmoil and conflicts, and may even lead to wars between countries, jeopardizing regional and global stability.



Global Climate Change

Human-induced climate change is mainly caused by changes in the content of greenhouse gases in the atmosphere. In addition, changes in suspended particulates in the atmosphere and changes in land use are also causes of climate change. Anthropogenic emissions of greenhouse gases have increased since the industrial era. Atmospheric concentrations of carbon dioxide, methane and nitrous oxide are now at their highest levels in the past 800,000 years.

Impacts due to climate change such as: forest fires, heat waves, droughts, acidification of sea water, floods, etc.



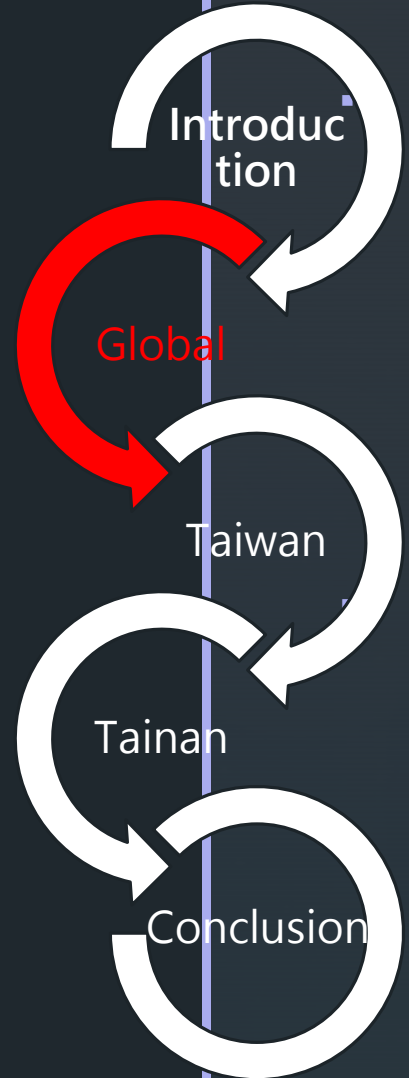
Causes of climate change

Natural factors

- Solar radiation: Greenhouse gases in the atmosphere absorb infrared radiation emitted by the Earth's surface and then re-radiate it, causing the greenhouse effect.
- Changes in Earth's orbit: Periodic changes in Earth's orbit and axial tilt relative to the Sun affect how solar radiation is distributed across the Earth's surface.
- Orogeny: Plate tectonics have a strong influence on the circulation of the atmosphere and ocean.

Human Factors

- Fossil fuel use: Since the Industrial Revolution, massive burning of fossil fuels, such as oil, natural gas, coal, etc., have been burned, resulting in a large increase in greenhouse gases such as carbon dioxide and methane.
- Human-made animal husbandry: In order to meet the living needs of human beings, deforestation, rice cultivation, livestock breeding, etc., will reduce plant photosynthesis, greenhouse gas emissions, etc., and increase temperature changes.



Impacts of Global Warming

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Global

Taiwan

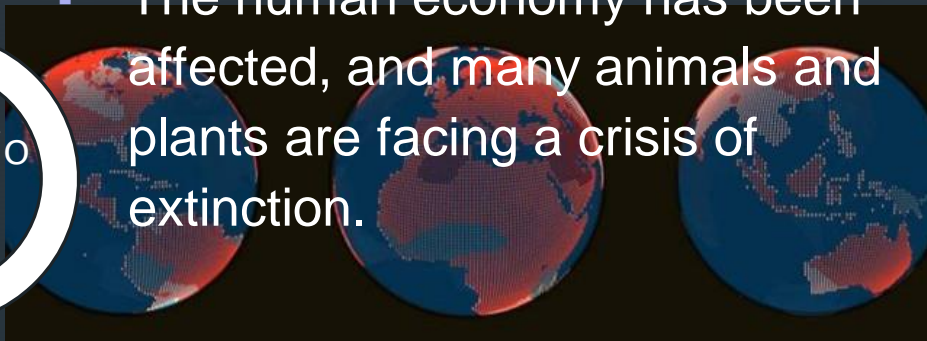
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Melting polar ice sheets, rising sea levels, inundating lower-lying coastal lands.

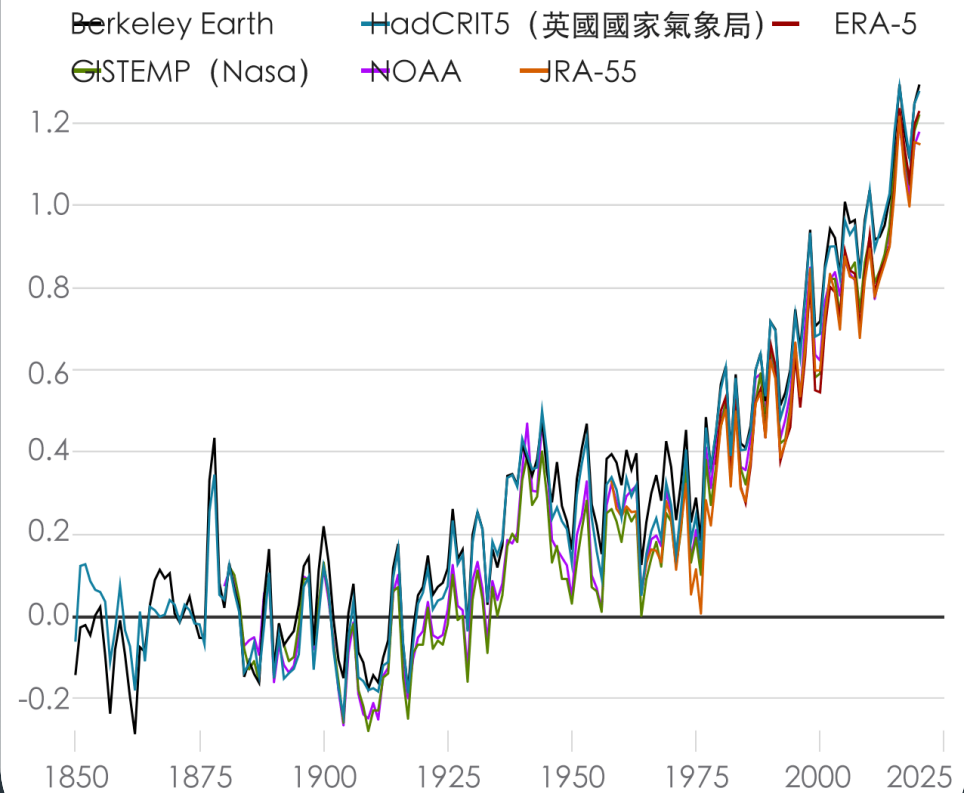
Global climate change, resulting in the expansion of abnormal rainstorms, droughts and desertification.

The human economy has been affected, and many animals and plants are facing a crisis of extinction.



自1850年以來氣溫逐漸升高

與工業化前水平相比，全球平均氣溫變化幅度， $^{\circ}\text{C}$



源：英國國家氣象局

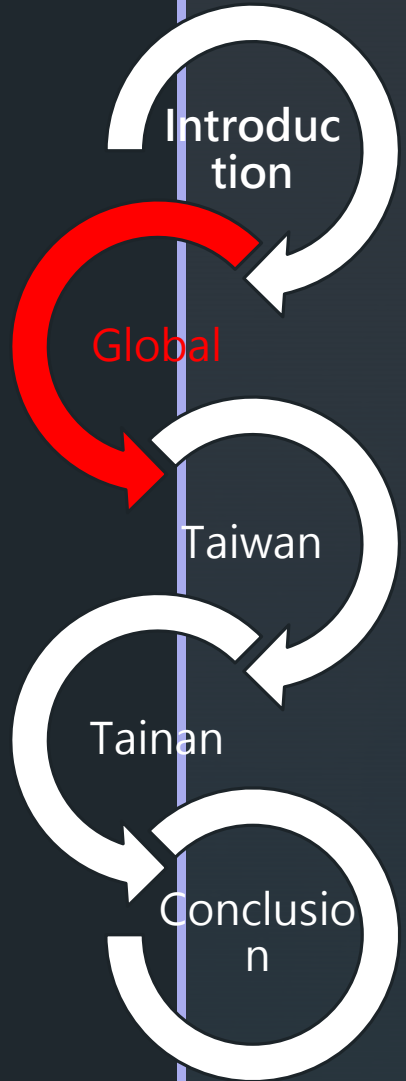
圖：BBC

Photo credit : [BBC](#)

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▶ The causes and effects of climate change



Source of the materials : [National Geographic](#)

The impact of climate change in Taiwan



The temperature rises

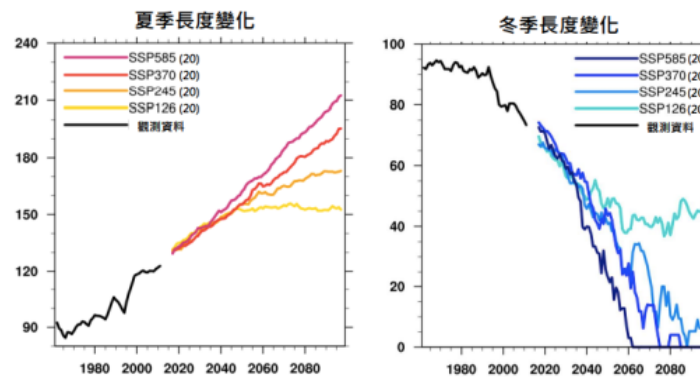
- Taiwan is warming faster than the world: According to the Taiwan Meteorological Observatory's observation of the annual average temperature change over the past 110 years, it is found that compared with the global warming of 1.07°C, Taiwan has warmed by 1.6°C, and the rate of warming in the past 30 to 50 years has also increased.

Seasonal changes

- Summers are longer and winters are shorter: The study found that the length of summers in Taiwan has increased from 90 days to 120-150 days, and the length of winters has been shortened to 20-40 days, which is equivalent to just over a month; and it is also seen that the degree of Taiwan's warming influence has increased very fast.

季節長度

- 未來推估臺灣的夏季長度從目前約130天增長為155-210天，冬季長度從目前約70天減少為0-50天。最劣情境下變遷明顯，理想減緩情境下之變遷相對緩和。



TCCIP

Source of the materials : [愛地球](#)

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Examples of the impact of climate change in Taiwan

Introduction

Higher chance of drought and flood

- The proportion of strong typhoons is higher. In the worst case, the number of typhoons facing Taiwan will be reduced by 15% in 2050 and 55% in 2100, which means that the source of precipitation in Taiwan will become more and more unstable.

Global

Taiwan

Sea-level rise

- Global warming, the melting of Arctic ice, the rise of sea levels, and the decrease in rainfall due to warming, the land of Taiwan has gradually become smaller! And a lot of things are also affected, such as:
 - Agriculture: Rice yield decreases by 10% for every 1 degree increase in night.
 - Forestry: Prolonged droughts can also lead to wildfires and landslides.
 - Fisheries: Rising sea temperatures will change the amount of marine fishery resources, with every 1 degree rise in the ocean, the total fish population will drop by 5%.

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Tainan and Climate change

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Greenpeace says ancient cultural city of Tainan will be hit hardest by rising sea levels

- Among the six capitals, **Tainan City is the largest affected area by sea level rise**. It is estimated that 426 square kilometres will be submerged under the sea by 2050. In addition to Anping Old Street, the historically valuable Anping Castle and the Sicao Green Tunnel known as "Taiwan's pocket version of the Amazon River" are all within the flooded area.



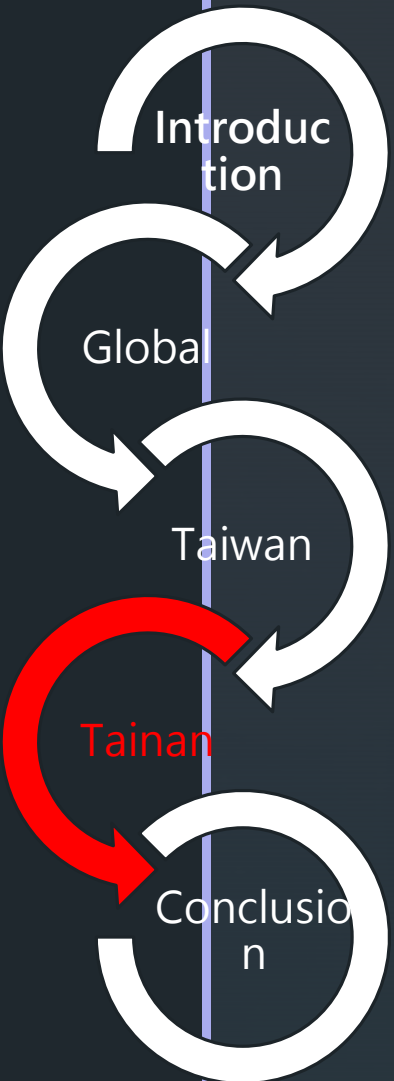
Sicao Green Tunnel in Anping District, Tainan City

表2. 2050年不積極減碳情境下六都海平面上升與暴潮之衝擊分析

		人口(萬人)	面積(km ²)	淹沒建築面積(坪)
臺北市	海平面上升	20.90	16.57	1,370,325
	海平面上升與暴潮	44.47	50.21	2,643,850
新北市	海平面上升	28.21	43.85	744,150
	海平面上升與暴潮	75.56	80.42	2,973,575
桃園市	海平面上升	0.81	17.46	9,075
	海平面上升與暴潮	2.23	33.30	175,450
臺中市	海平面上升	4.42	64.32	653,400
	海平面上升與暴潮	18.14	136.93	3,412,200
臺南市	海平面上升	17.28	310.98	399,300
	海平面上升與暴潮	33.72	426.65	4,322,725
高雄市	海平面上升	19.74	95.66	1,461,075
	海平面上升與暴潮	32.43	114.47	1,775,675

Source of the materials : [GREENPEACE綠色和平](#)

Climate change in Anping in recent years



The ancient capital has become a water capital! Tainan is flooded on a sunny day, experts worry: climate change.

- Climate change has flooded the Tainan Canal on sunny days. People in Tainan discovered on the morning of August 12, 2022 that the entire canal was flooding the sidewalk, and the water level was more than 20 centimeters high. The sea water by the fishing port directly flooded into the workhouse, but it was flooded even though it was not even half a drop of rain. Like a typhoon passing through...

Anping is where we live, but the issues we are facing now...

- Simen Experimental Elementary School is located in the coastal area of Anping. It has experienced five floods in history, and the cultural relics of the school have been submerged by floods. How to cope with the rising sea level caused by global warming is an urgent issue we need to solve.



Anping Canal flooded on sunny day



Simen Experimental Elementary School has experienced 5 floods

Conclusion-What is the future of our hometown Anping?

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Competing with the sea or coexisting with the sea

- Anping stands near the sea. Four hundred years ago, it was the vast inland sea of Taijiang River. Now it is located at the mouth of the climate change. If the trend of global warming remains unchanged, it will return to the embrace of the sea in 2050. We shall resist change, or adapt to the environment to develop a sustainable life that coexists with the sea, which will test the wisdom of our future generations.



The present and past of Anping: the present Anping Old Fort and the Taijiang Inland Sea 400 years ago