

Abstract

The research aims to investigate what weather conditions in Beitou district, Taipei are suitable for people to hang out or engage in outdoor activities. Data like average monthly temperature(18°C~25°C), rainfall (0mm)and relative humidity(45%~60%) from 2014 to 2018 are the resources with which we compare and contrast in the process of investigation.

First of all, we compare weather observation data of Zhong Zheng senior high (ZZSH) with the that in Central Weather Bureau, analyzing the yearly climatic changes and further the climatic phenomenon based on the data retrieved each day and per month.

Research revealed that the weather conditions from November 10th to 15th and December 1st to 6th best meet our need. According to the results in the investigation, the High Pressure Reflow Pattern can account for why the weather conditions during the specific dates in November and December were stable and nice. Moreover, windward side and leeward side have great impacts on the local rainfall; global warming also causes some problems, such as the weather of spring would become more unpredictable.

A. Research Motivation





In the elective course in this semester, our mentor will take us outdoors for field investigation. Everyone expects the weather condition when we engage in field investigation to be nice, not too hot or rainy. Therefore, we start to be curious about what factor comprises the best day when it is ideal for us to conduct this investigation.

B. Purpose of the Research

In order to find out the perfect date for us to engage in this investigation, we refer to the data from the monthly temperature, monthly rainfall and relative humidity in Beitou district. Besides, in order to find out the result, we make use of the data from the central weather bureau and ZZSH, designing the charts as follows:

1. Data of average monthly temperature and rainfall retrieved from each observation station in 2018.
2. Data of average monthly temperature and rainfall retrieved from 2014 to 2018.
3. Data of relative daily humidity per month from 2014 to 2018.

C. Research Equipment

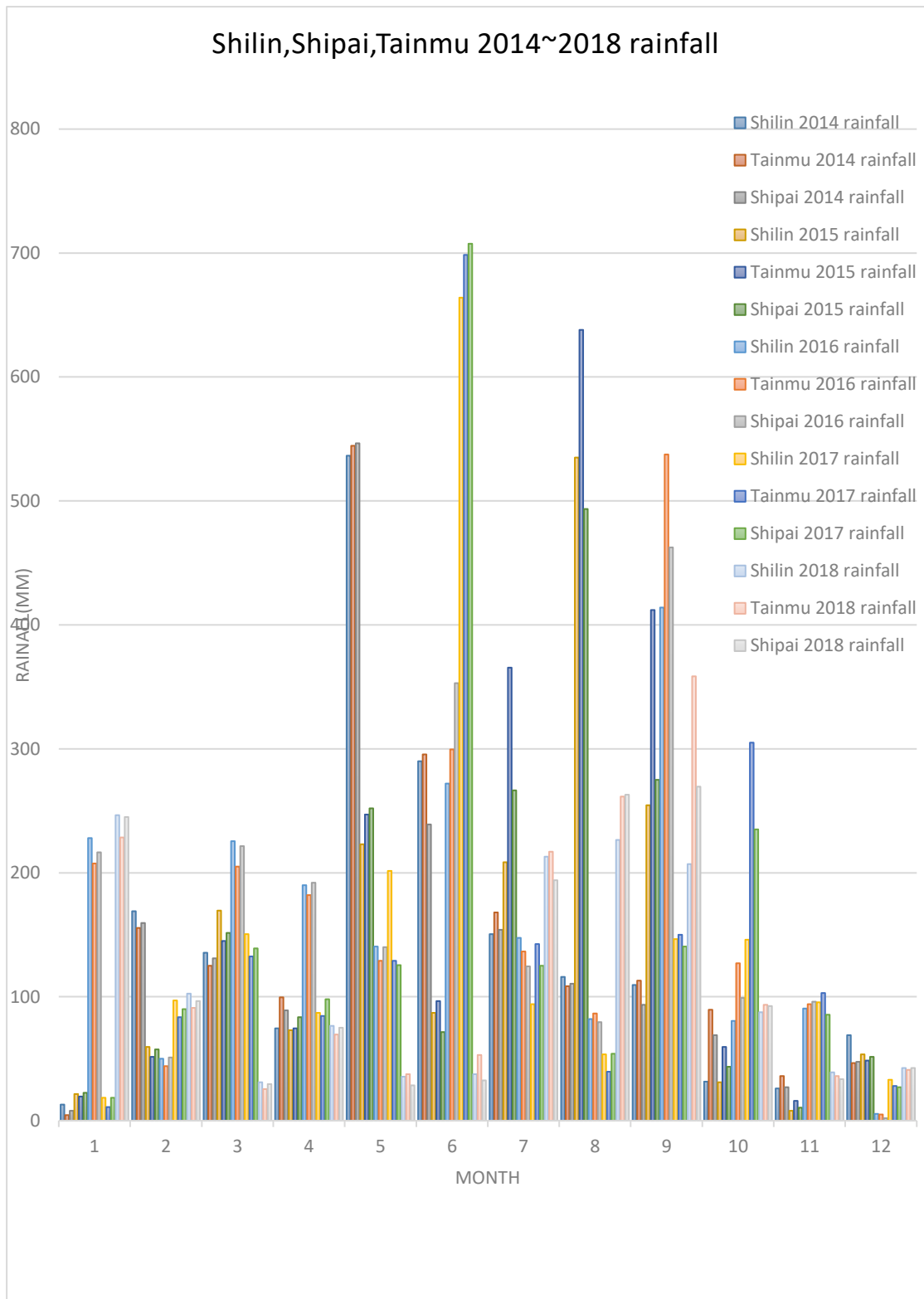
Equipment	Equipment	Application
Thermometer	 <p>A digital thermometer with a yellow casing. The LCD screen displays two temperature readings: 21.30 (labeled 'LF') and 18.80 (labeled 'RT'). Below the screen are three buttons labeled 'ON', 'MAX', and 'MIN'. The brand name 'Dewberry Supplies, Inc.' is visible at the bottom of the device.</p>	Measure the highest and lowest air and soil temperature on the day and last six days
Barometer	 <p>An analog barometer with a gold-colored metal frame and a white face. It features multiple concentric scales for pressure measurement in various units: hPa, mmHg, and inches of mercury. The needle points to approximately 1010 hPa.</p>	Measure the air pressure
Rain Gauge	 <p>A vertical rain gauge consisting of a clear plastic cylinder mounted on a black base. It is used for collecting and measuring rainfall.</p>	Collecting rainfall to know the day's rainfall
Hygrometer	 <p>A digital hygrometer with a red and white face. The top display shows a temperature of 20.4°C. The bottom display shows a relative humidity of 22.7%. It also includes a digital clock and several control buttons.</p>	Measure air humidity

D. Research process and method

- I. We downloaded the data in each month in 2018 from Central Weather Bureau and ZZSH's data from Globe, and then observed and chose the months which have less than 40mm rainfall.
- II. We chose three observation stations near ZZSH, which are Shihlin, Tianmu and Shipai.
- III. We chose the days have less than 40mm rainfall, that conform to the requirement.
 - a. Requirements: the daily rainfall should be 0mm, the daily temperature between 18°C and 25°C and the relative humidity of the day between 45% and 60%.
 1. Relative humidity: According to the news report^[1], the range of relative humidity should be comfortable to human body, the humidity too high or too low will make us feel uncomfortable.
 2. Temperature: Temperature feeling depends on each person, so we set the temperature range between $18^{\circ}\text{C}\sim 25^{\circ}\text{C}$.
- IV. For understanding the observation data in 2018 is match with the long-term data from Central Weather Bureau, so we see the data in last 4 years(totally 5 years) to confirm the suitable date.

E. Results of the Research

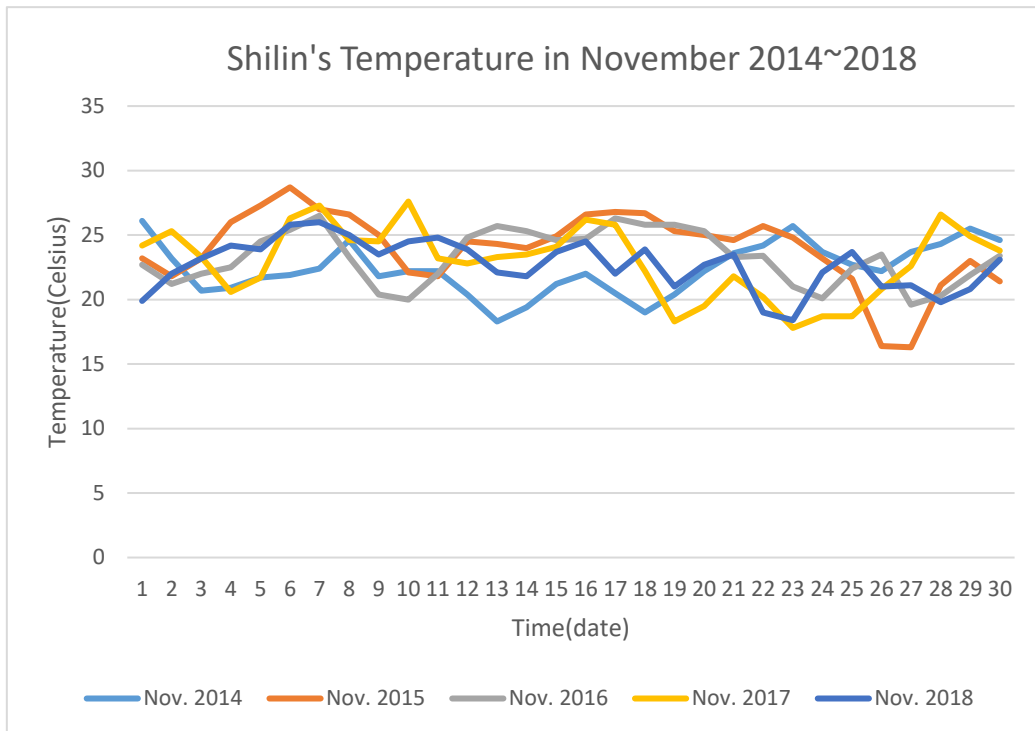
- I. Observing the data, about rainfall and average monthly temperature, we found the data conform to ours requirements in March, November and December.(Chart.1)



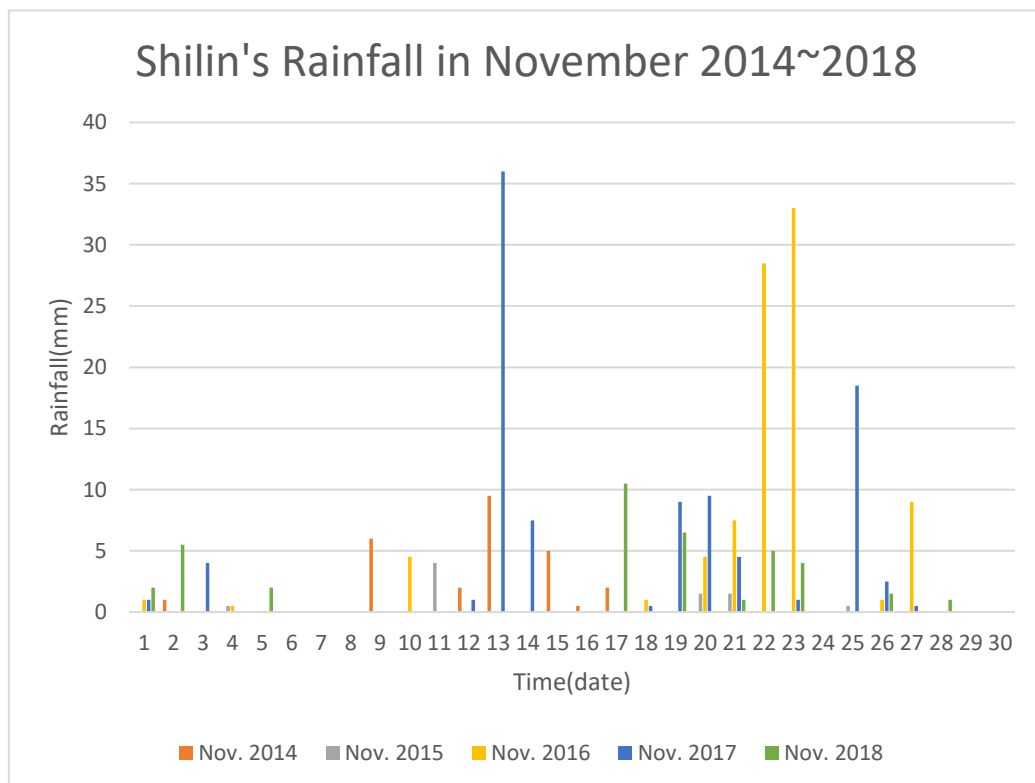
(Chart 1:Shilin,Shipai and Tainmu 2014~2018 rainfall)

II. We found the weather between Nov. 10th and Nov. 15th conform to ours conditions, in terms of rainfall, average monthly temperature and relative humidity. Therefore, we conjecture that the middle third of November are the

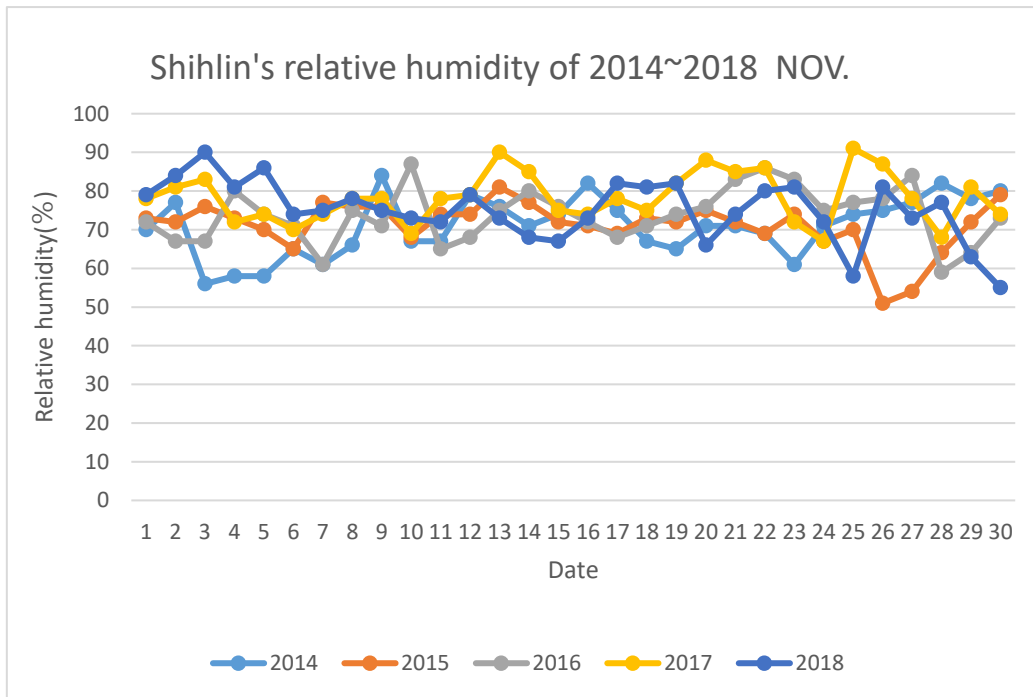
best day to do outdoor activities, then we look for the last five-year data and check if the date are correct. Finally, we conclude that the dates between Nov. 10th and Nov. 15th are suitable for us to do outdoor activities.(Chart 2-1, 2-2, 2-3)



(Chart 2-1 Shilin's temperature in November 2014~2018)



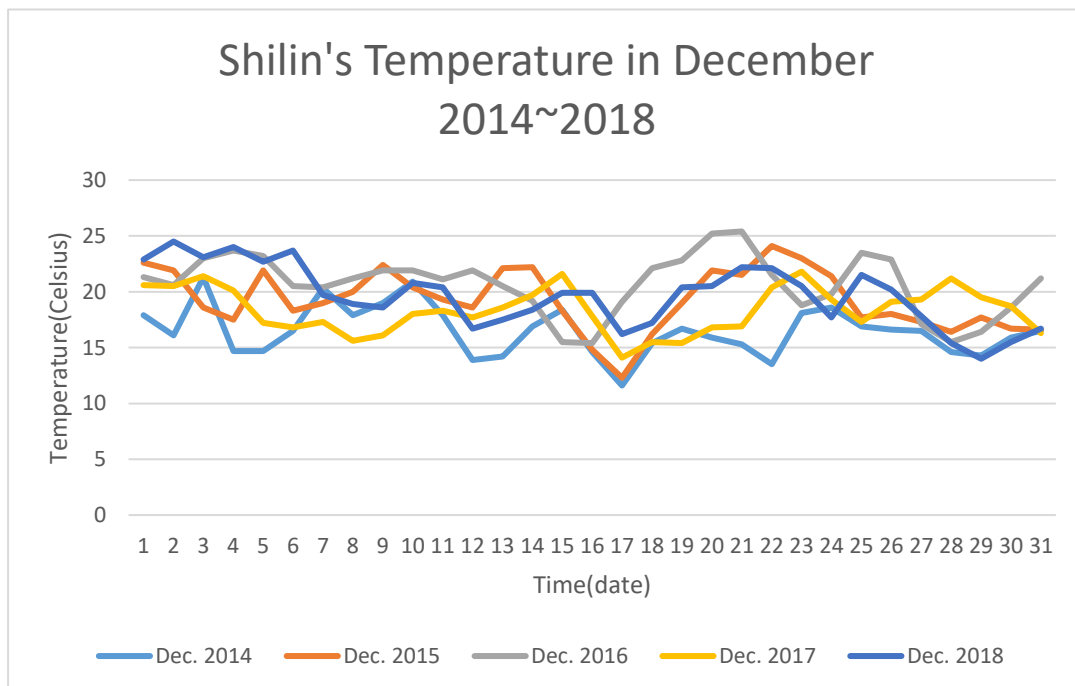
(Chart 2-2 Shilin's rainfall in November 2014~2018)



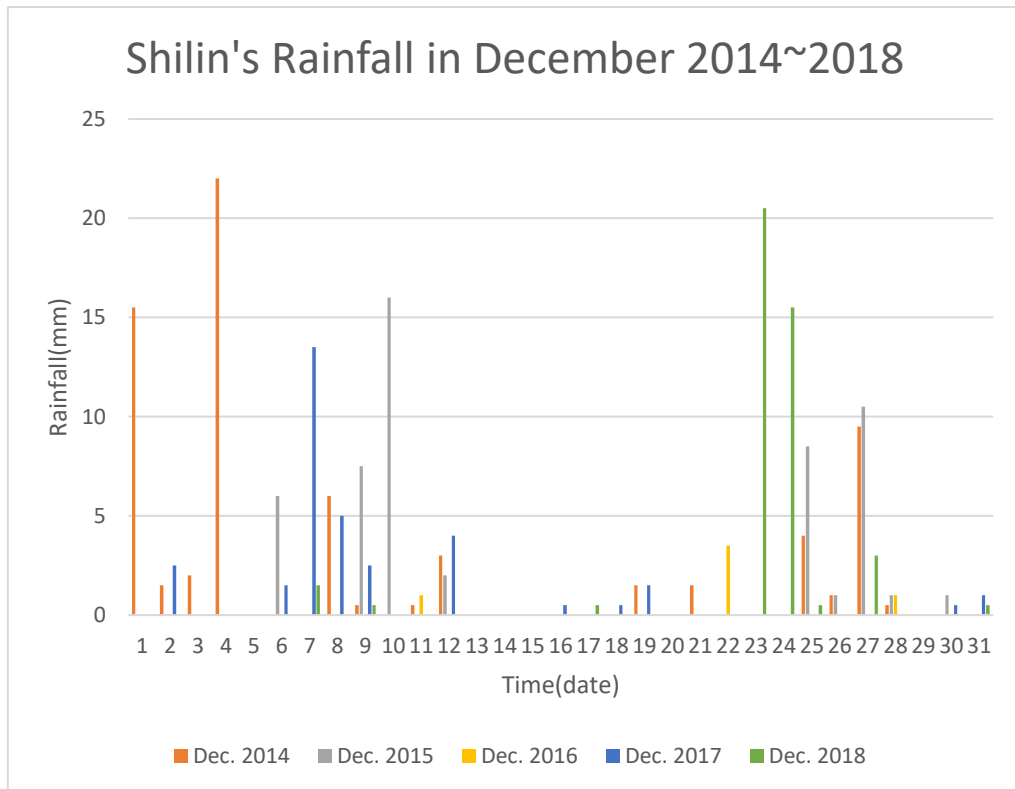
(Chart 2-3 Shilin's relative humidity in November 2014~2018)

III. We found the date between Dec. 1st and Dec. 6th in 2018 conform to our condition, and we also used the last five-year data to confirm that on those date are sunshine, no rainy and have a comfortable humidity. Therefore, the date between Dec. 1st and Dec. 6th is also a nice day to do the outdoor activity.

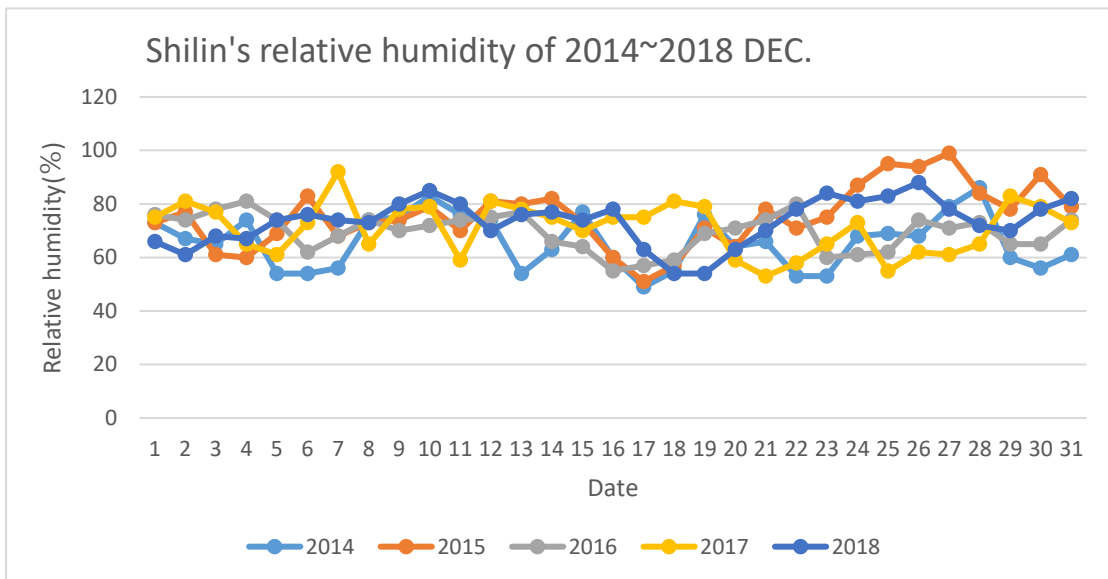
(Chart 3-1, 3-2, 3-3)



(Chart 3-1 Shilin's temperature in December 2014~2018)



(Chart 3-2 Shilin's rainfall in December 2014~2018)

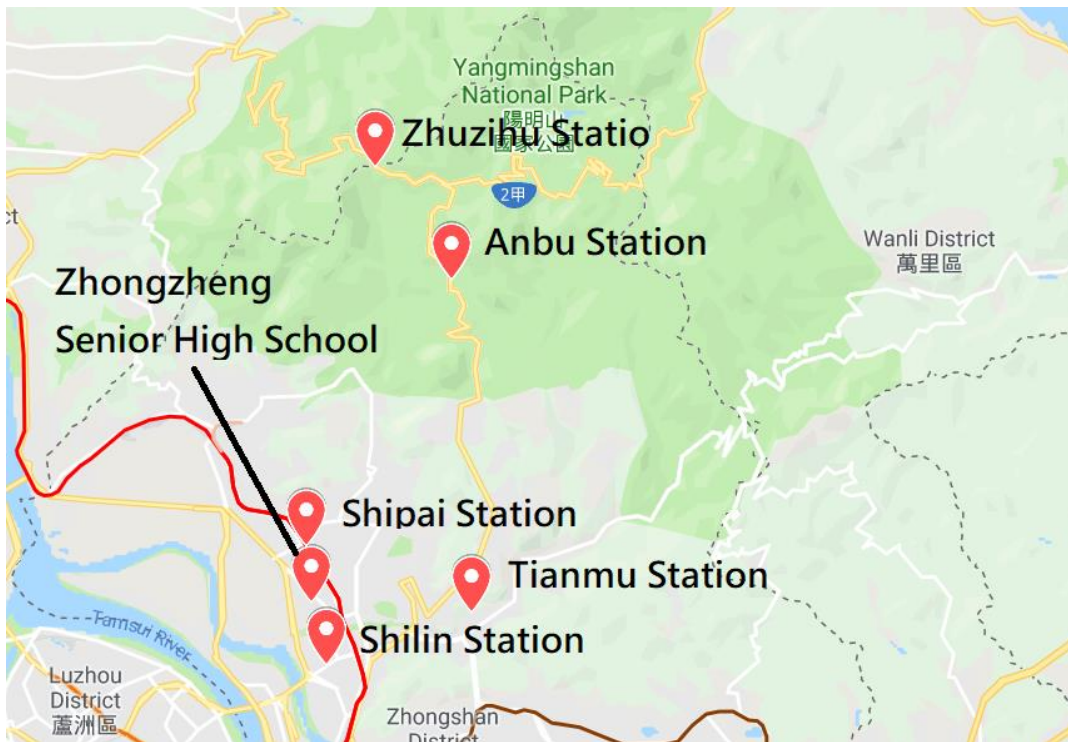


(Chart 3-3 Shilin's relative humidity in December 2014~2018)

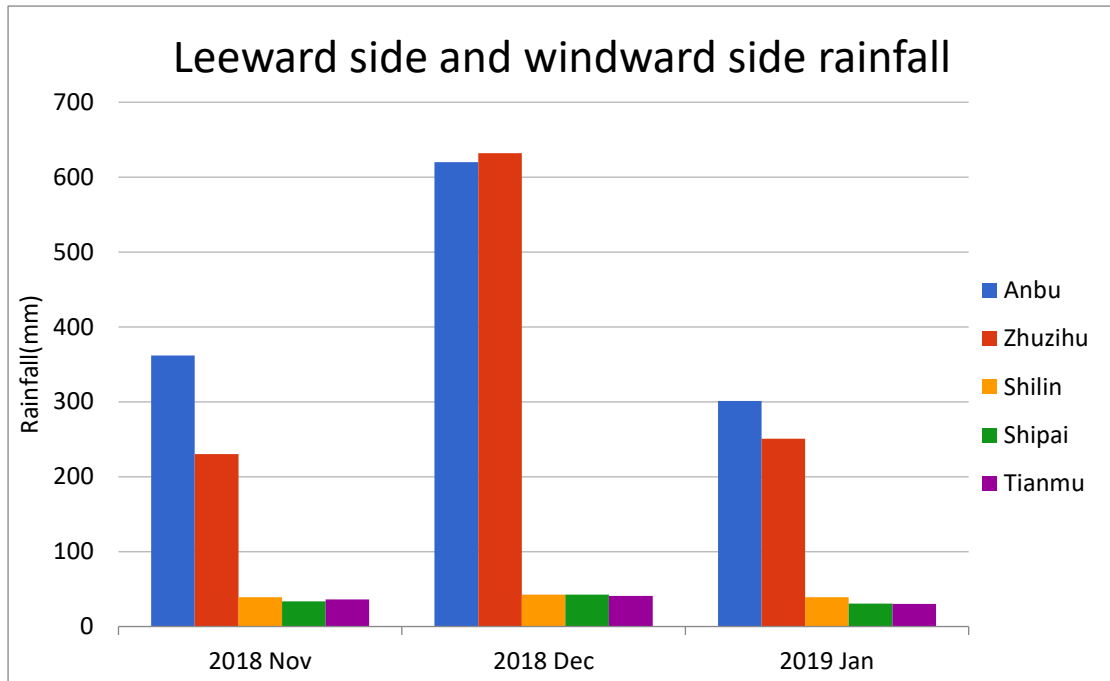
IV. In March in 2018, there have six days, each of them are 11th, 12th, 24th, 25th, 30th and 31th, conform ours condition. But, the dates in last five years data is not show like this year, we think March is not improperly for us to research it. (Chart 1)

F. Discussion

- I. According to the result of observe the data, Shilin, Shipai and Tianmu in middle third of a month in November and between Dec. 1st and Dec. 6th have less rainfall, also have great temperature to do outdoor activity.
 - a. In winter, the sun moves from summer solstice to winter solstice, so Taiwan doesn't get much heat. Thus water droplets are less likely to condense and form cloud and rain, so we will have fair weather
 - b. Because Taiwan is located in monsoon area, the northeast monsoon will bring the rain to Taiwan. But ZZSH, Shilin, Shipai and Tianmu are located at leeward side of Datuen volcanos, and the mountain decreases the moisture so the rainfall also becomes lower.(Chart 4-1, 4-2)



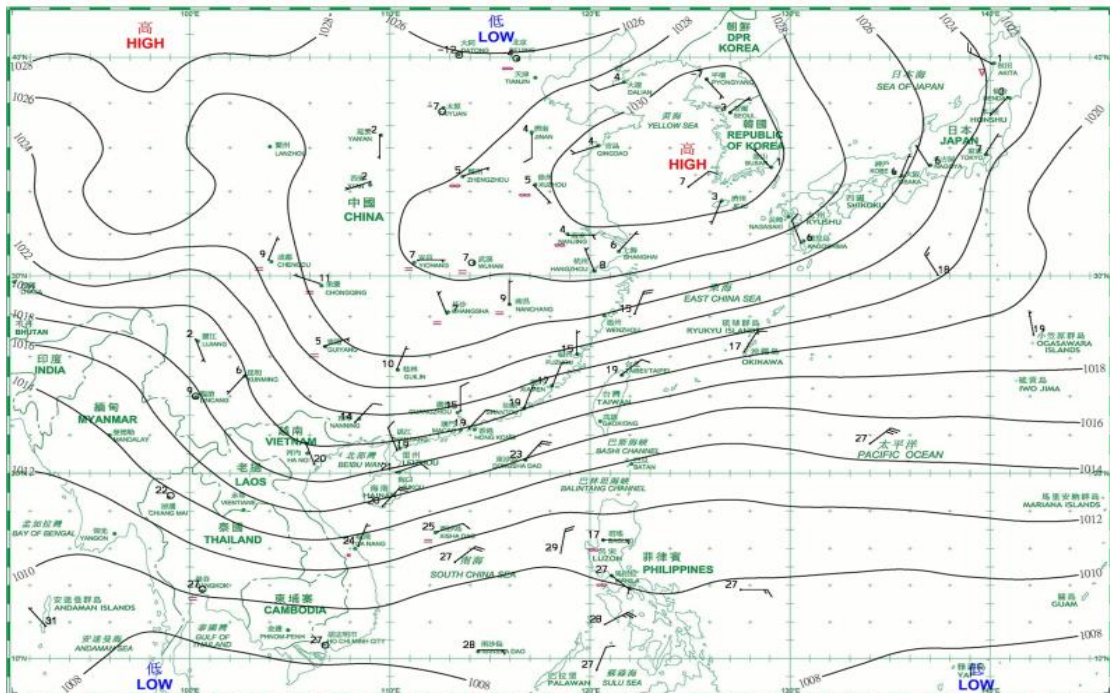
(Chart 4-1 Location)



(Chart 4-2 Leeward side and windward side rainfall)

II. We analyzed weather patterns in the periods of time of the year. These days saw fair weather because Siberian High moved to the east and the cold air was warmed by the ocean. The high pressure and warm air contribute to a fair weather.(Chart 5)

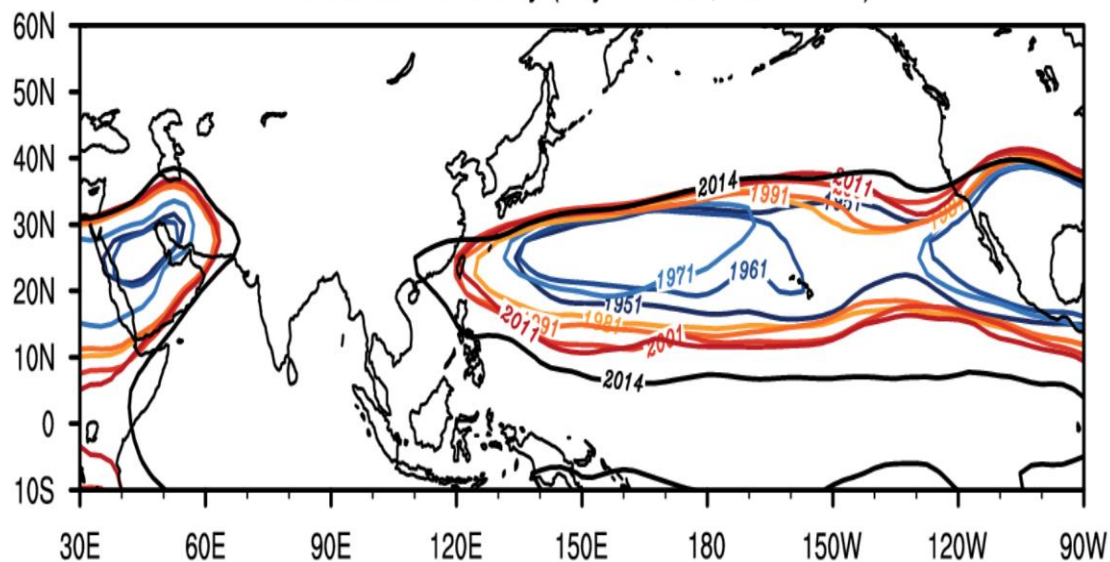
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(Chart 5 Image of Siberian High)

III. Spring rain was normally expected in March as stationary front would affect the weather, but global warming has affected the rainfall.^[8] And this picture shows the Pacific High is rain zone and as the Pacific High is affected by global warming, it moves westward and ends up with no rain.(Chart 6)

JJA 500hPa Geopotential Height & 5870m Contour
Decadal Variability (10yrs mean, 1951-2014)



(Chart 6 Image of Pacific High)

G. Conclusion

According to our research, the mid of November and early of December of every year, weather patterns have relatively similar and the weather is more stable. Referring to the data of the past to select what day is better to go outside. Because of the high pressure reflux pattern, temperature rises everywhere in Taiwan so we can choose between 11/10~11/15 or 12/1~12/6.

H. Reference

- 1 李思雨，2017，<https://kknews.cc/zh-tw/science/oormb8p.html>
- 2 GLOBE Data ,<https://www.globe.gov/>
- 3 中央氣象局資料彙整，<http://e-service.cwb.gov.tw/HistoryDataQuery/index.jsp>
- 4 風花圖，<https://www.cwb.gov.tw/V7/about/yearpaper.htm>
- 5 地面天氣圖，<http://blog.isky.tw/2017/11/20171106-1179-httpevent.html>
- 6 等壓線圖，<https://www.hko.gov.hk/contentc.htm>

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- 7.1 <http://www.epochtimes.com/b5/5/11/20/n1126285.htm>
- 8 全球暖化的影響，<https://www.ntsec.gov.tw/FileAtt.ashx?id=1948>