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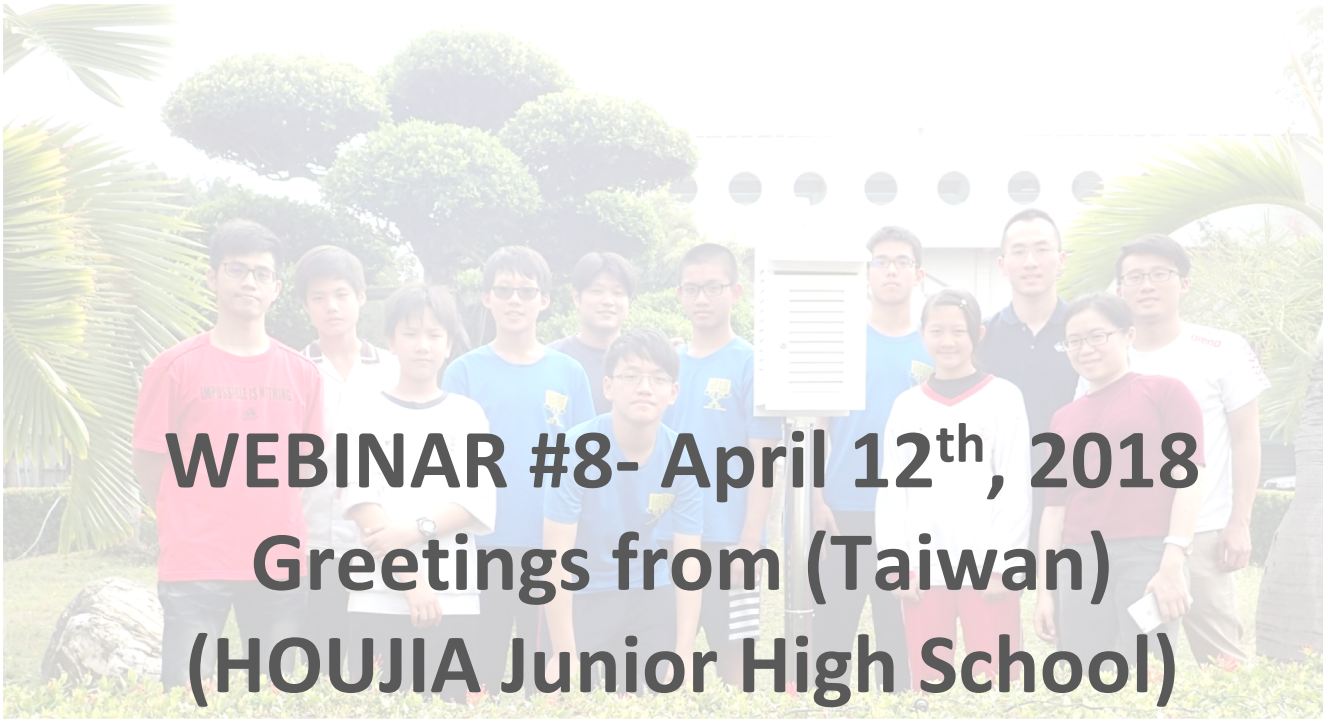
The ENSO Field Measurement Campaign Phase III: Water in Our Environment



WEBINAR #8- April 12th, 2018
Greetings from (Taiwan)
(HOUJIA Junior High School)

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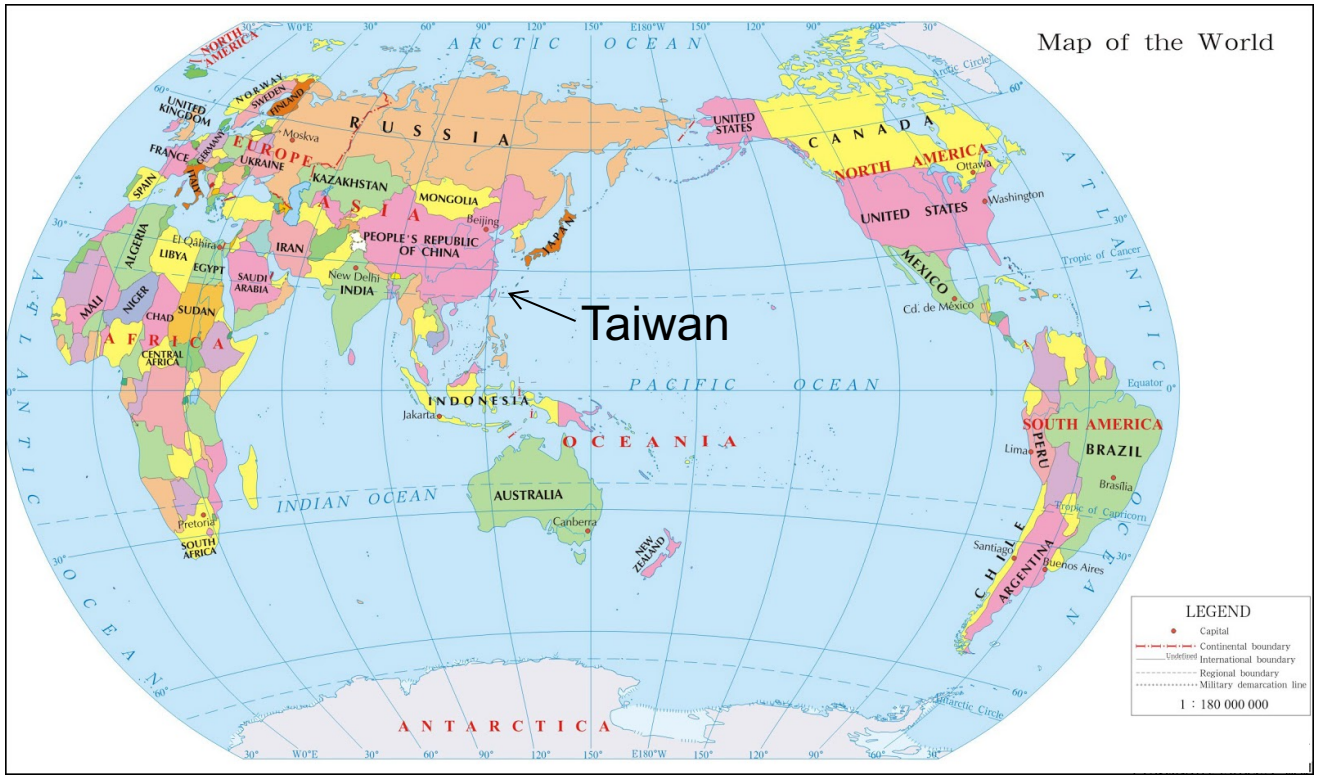
Introduction-Tainan City

Tainan City



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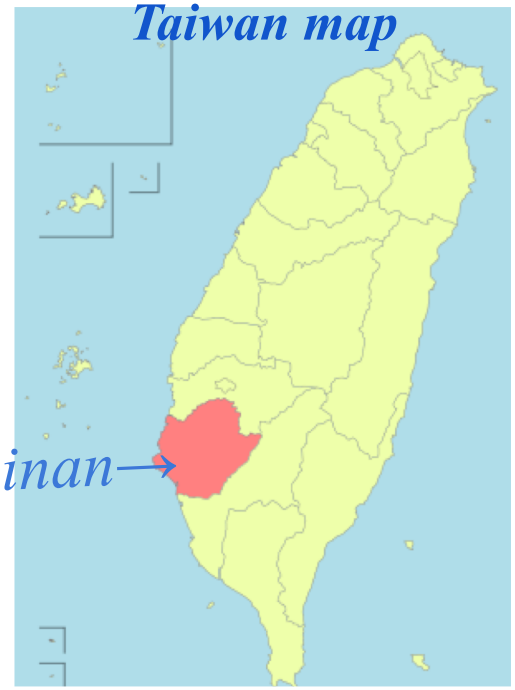
Introduction-Tainan City

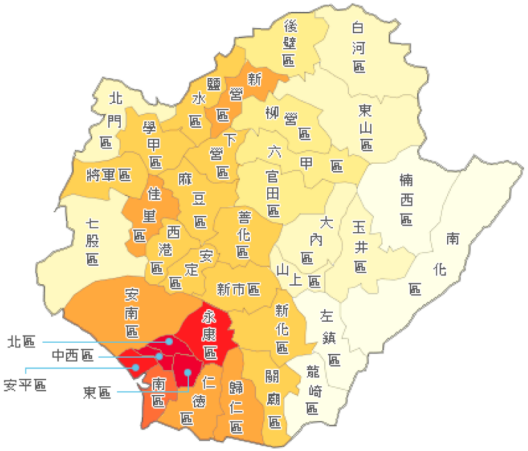
The earliest established city in Taiwan

Latitude :22.55 °N,
Longitude :120.03°E

Area :2,191.65 km²

Population: 1.88 Million





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Introduction-Tainan City

Tainan is the cultural place of origin, also is fills an antique place.
Not only has many historical sites, also has many famous snacks.
It is a beautiful city in Taiwan.

Milkfish Porridge

Coffin board

Chihkan Tower

Anping Castle

Bean jelly

Bowl cake

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Introduction-Tainan's Climate

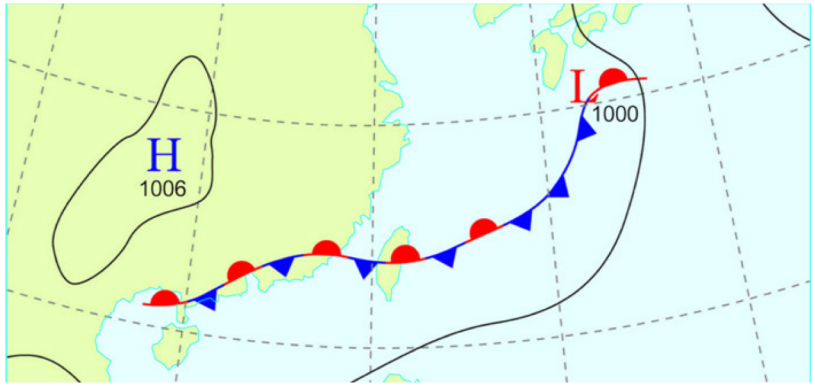
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Average Temperature (°C)	17.6	18.6	21.2	24.5	27.2	28.5	29.2	28.8	28.1	26.1	22.8	19.1
Average Rainfall (mm)	17.3	28.1	38.5	79.5	173.6	371.5	357.7	395.1	178.0	27.8	16.7	14.4

Tainan's Climate Data (1981 to 2010) Source : Central Weather Bureau, CWB

Dry Season: Winter and Spring

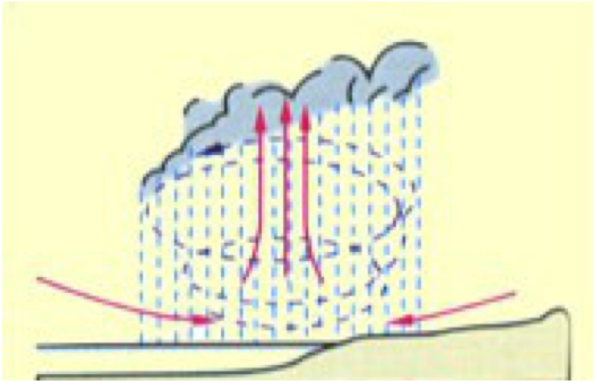
Rainy Season: Summer

Introduction-Tainan's Climate



May and June
Plum Rain Season
caused by
Stationary Front

Summer
Afternoon
Thunder Storm
caused by
Hot and Humid
South west winds



Summer
Typhoon Season
In Taiwan

Introduction-HOUJIA Junior High School

Principal
RUI-RONG CHEN

Established in 1967

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Introduction-HOUJIA Junior High School

Students
Grade 7: 630
Grade 8: 591
Grade 9: 689

Faculty
Teachers:146

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Introduction-Water Source

Wusanto Reservoir

↓

Tanding Water Purification Plant

↓

School

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Introduction-Water Source

Wusanto Reservoir
Estabished in 1920
Total Capacity:15415 million m^3

Tanding Water Purification Plant
Estabished in 1970
Yields: 180 thousand CMD

Source : Taiwan Water Coperation

Introduction-HOUJIA GLOBE



Applied to National Central University, NCU in Oct. 2014
Trained First Group Members in Apr. 2015
Established in Jan. 2016

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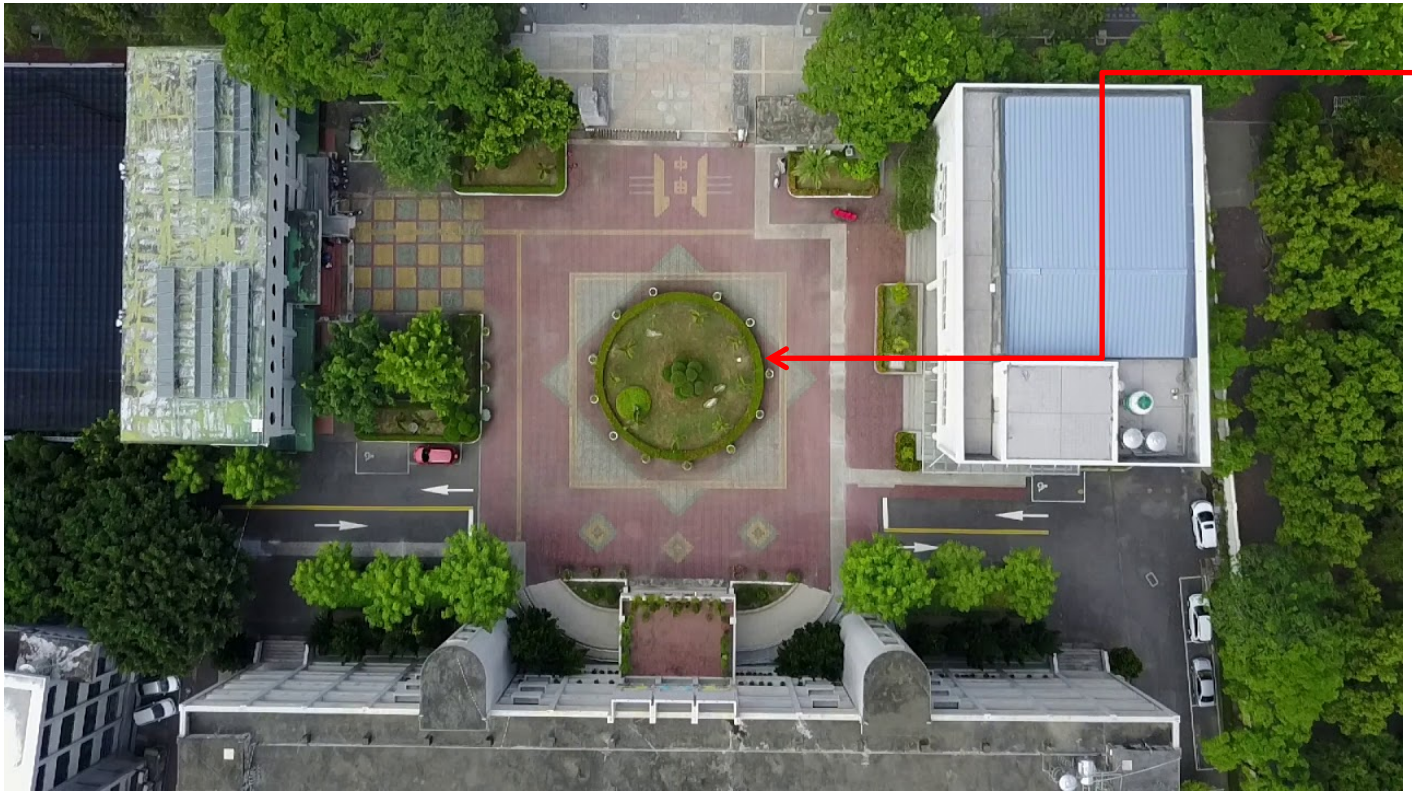
Introduction-HOUJIA GLOBE



Established Davis Automatic Weather Station in Dec. 2017

Trained 33 students in this project since 2015

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Data and Methods

GLOBE Precipitation Data
- Atmosphere Protocol
- Daily Accumulation
- Since Jan. 2015

Davis Precipitation Data
- Collecting Automatically
- Every 15 minutes records
- Since Dec. 2017

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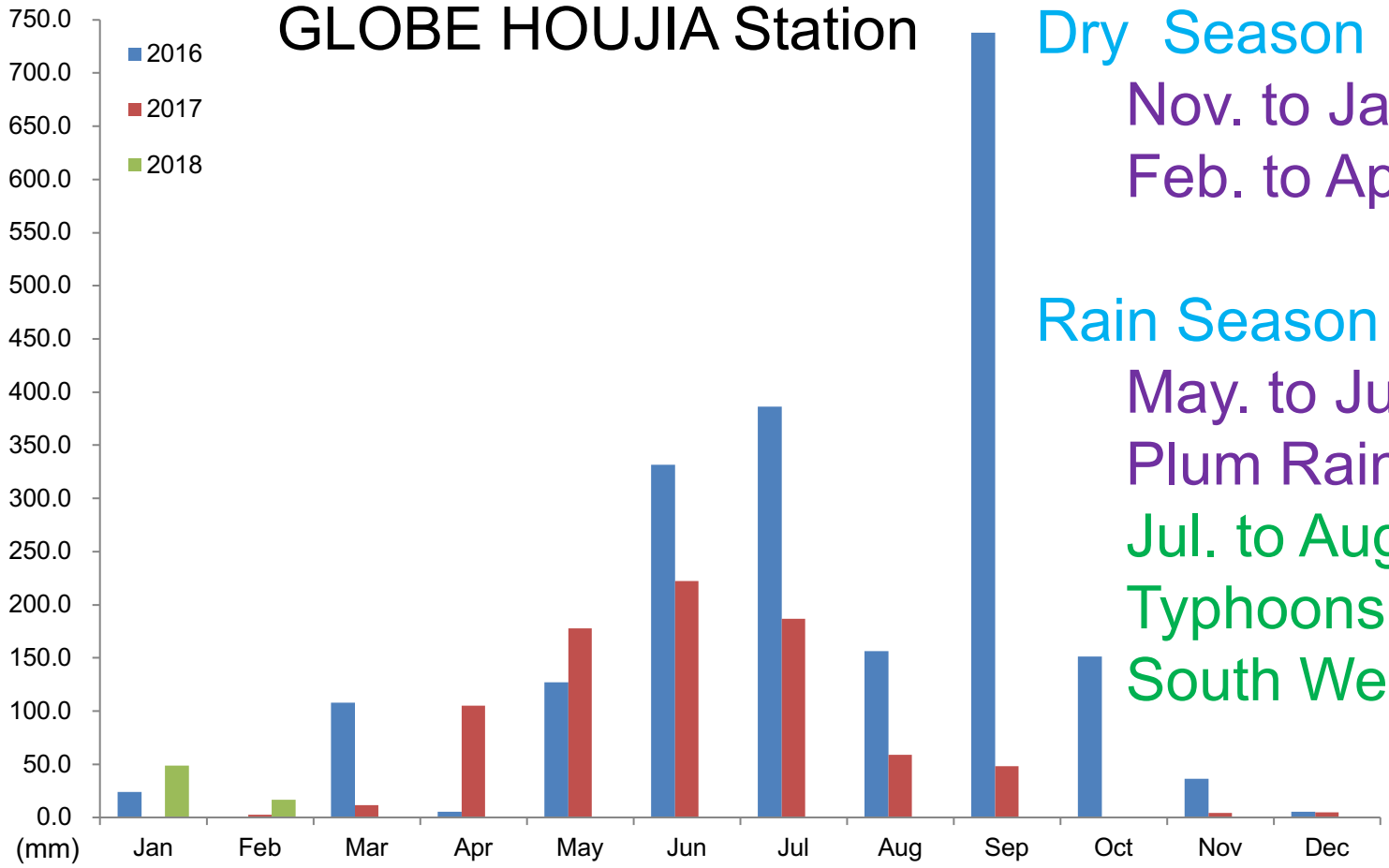
Data and Methods-
Nearby Central Weather Bureau, CWB Stations

YongKang Station
5.8 km North

Tainan Station
1 km West

Compare our data to these two stations

Results and Discussion-Monthly Precipitation



Dry Season

Nov. to Jan. (Winter)

Feb. to Apr. (Spring)

Rain Season

May. to Jun.

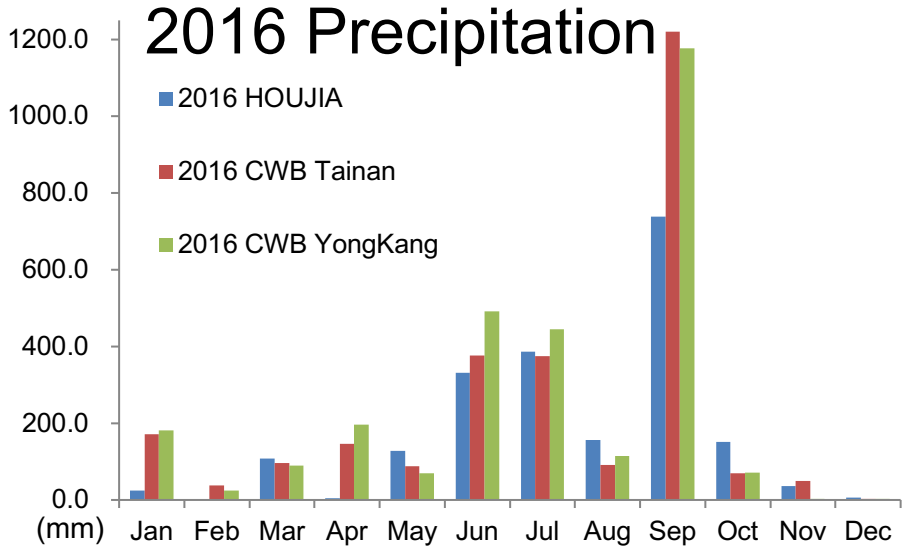
Plum Rain Season

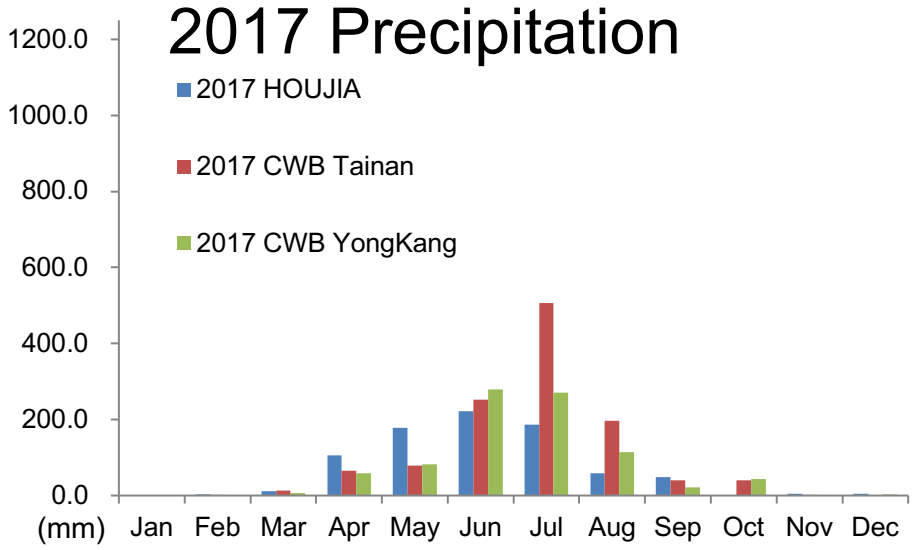
Jul. to Aug.

Typhoons and

South West winds

Results and Discussion-Compare to CWB Stations

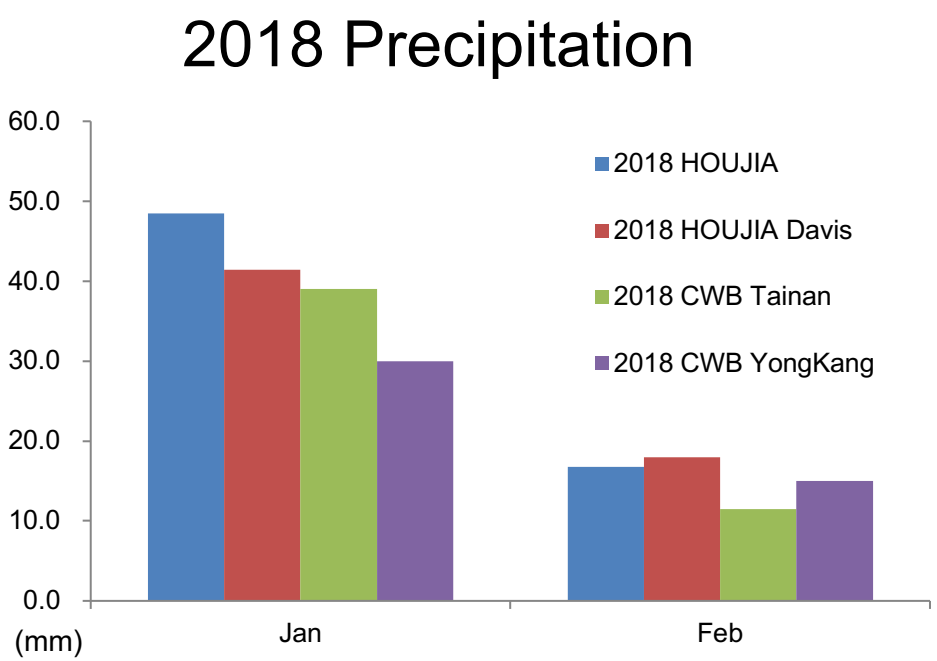




Same trends to government weather station data

Precipitation in 2016 is more than 2017 significantly

Results and Discussion-Compare to Davis in 2018



Same trends to government weather station data

Our GLOBE data is close to Automatic Davis data

Good Data Quality

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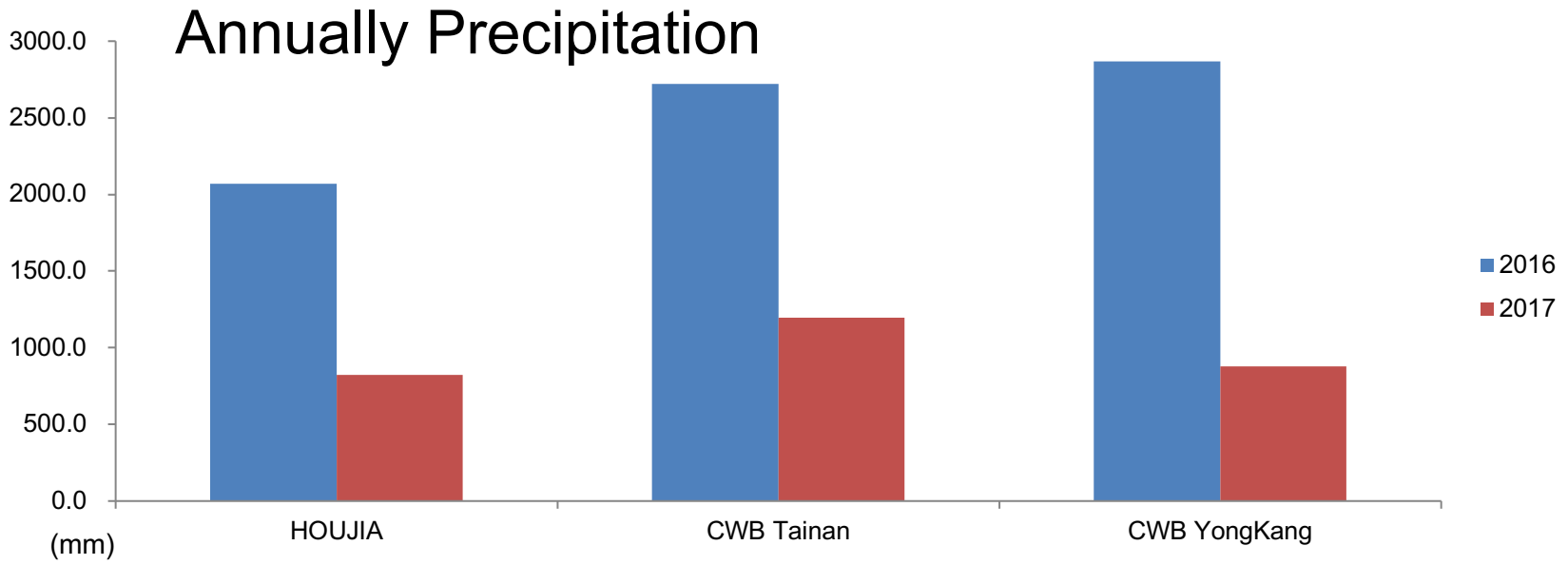
Results and Discussion- Precipitation 2016 v.s. 2017

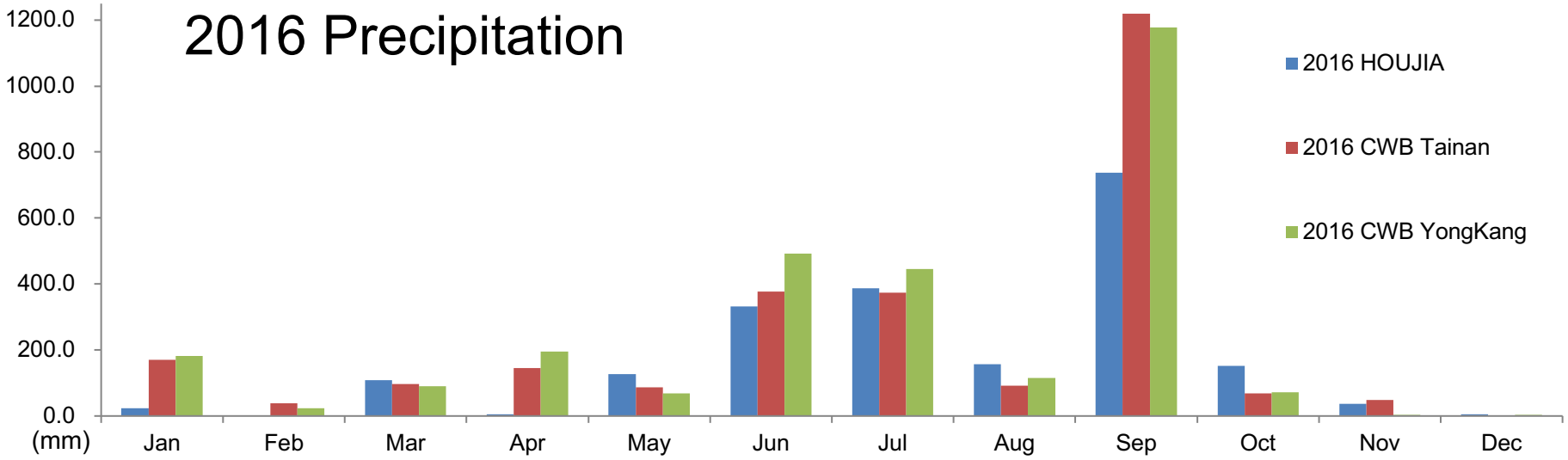


More rain in 2016 (1.5 times higher than average) Source : CWB

Possible caused by El Niño and La Niña

Typhoons bring much more rain to Tainan in 2016

Results and Discussion- La Niña



La Niña impacts on Precipitation:More Typhoon strike Taiwan La Niña period in September 2016

Source : CWB Monthly Report on Climate System 2016 Mar. to Sep.

Results and Discussion- Typhoons 2016 v.s. 2017

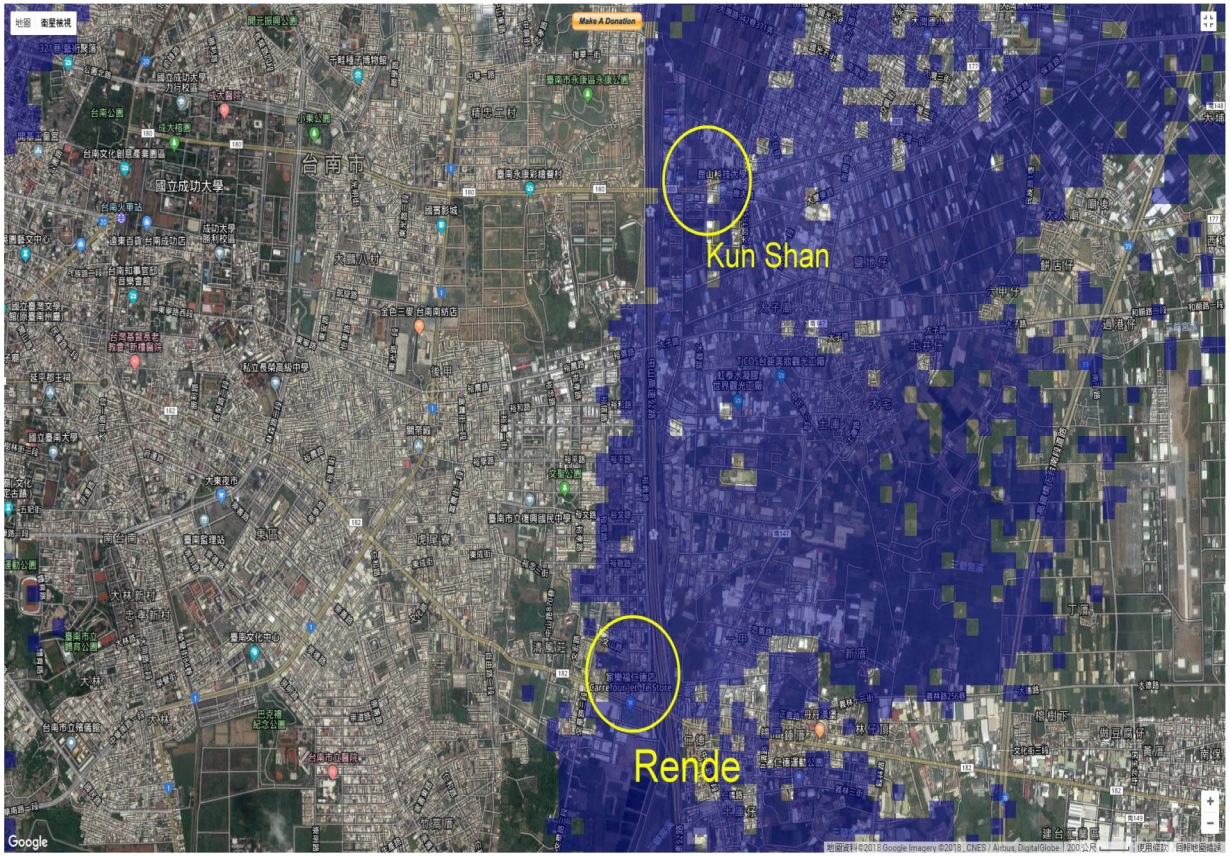
Name (Code)	Category	Warning Time	Accumulated Rainfall (CWB Tainan)	Accumulated Rainfall (Houjia)
NEPARTAK (201601)	Violant Typhoon	2016-07-06 14:30 2016-07-09 14:30	161.5	160.6
MERANTI (201614)	Violant Typhoon	2016-09-12 23:30 2016-09-15 11:30	139.5	165.3
MEGI (201617)	Very Strrong Typhoon	2016-09-25 23:30 2016-09-28 17:30	363.0	not reported
AERE (201619)	Tropical Storm	2016-10-05 11:30 2016-10-06 14:30	1.5	2.4
NESAT (201709)	Typhoon	2017-07-28 08:30 2017-07-30 14:30	14.0	33.1
HAITANG (201713)	Tropical Storm	2017-07-29 17:30 2017-07-31 08:30	331.0	33.1
HATO (201713)	Typhoon	2017-08-20 23:30 2017-08-22 17:30	1.0	1.0

Source : CWB Typhoon Database

Typhoons striking Tainan
2016 : 4
2017 : 3

Accumulated Rainfall by Typhoon
2016 : 665.5 mm
2017 : 346.0 mm

Results and Discussion- Flood Map in Tainan



Source : Flood Maps

Kun Shan↑

Rende↑

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Results and Discussion- Arctic Oscillation in 2016

Tainan's average low temperature in Jan. is 14.1 ˚C

Negative Arctic Oscillation effect Tainan in Jan. 2016

The Lowest temperature on Jan. 24th is 5.1 ˚C

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Results and Discussion- Mango in Tainan 2016

Mango is Tainan's most famous fruit

Blossom during Jan. to Mar.

Negative Arctic Oscillation in Jan.

Ripe in summer

More Typhoon in summer

Mango yields is significantly low in 2016

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Conclusions

1. Seasonal changes of precipitation
2. Reliable data quality
3. More rain in 2016 than average

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Conclusions

4. La Niña in mid-2016 caused more typhoons to strike Taiwan
   More rain than average
5. High precipitation during typhoons or Southwest winds may cause floods in low-lying regions
6. Negative Arctic Oscillations in Jan. 2016
   Lowest temperature: 5.1°C
7. 2016: low temperature in winter + high precipitation in summer
   Lower mango yields in Tainan




Perspective-Do the observation Everyday

Do the GLOBE
More Precise
More Accurate
More Efficient

Learn More
About
The Weather
Care More
About
The Environment

Grade 7 students

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Perspective-International Virtual Science Symposium

Grade 8 students

Do the GLOBE

Find something Interesting from oberservation

Do some research for it
Share the results to others (IVSS)
Next Webinar

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Perspective-Next Level to the HIGH school

Keep the enthusiasm for the Science

Study More

Do More

Grade 9 students

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Thanks for Your Attention

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Teacher : YI-TA PAN

Students:

Grade 9:

MUHE CHEN, HSIEN-HAN LAI , HSIN-YU WU

Grade 8:

PIN-HANG WANG, YU-HSUAN LIANG, JUN-WEI SUN
NING YUEH, YUN-CHEN TSAI, CHE-YU CHENG

Grade 7:

TSAI-NA KUO, CHE-CHUN HSU, HSIANG-EN WANG
TING-AN LIU, TING-WEI BI, SHEN-HONG YANG
TZU-CHING SHEN, YU-XUAN HUANG, PEI-QIN WE
YU-FANG LIN