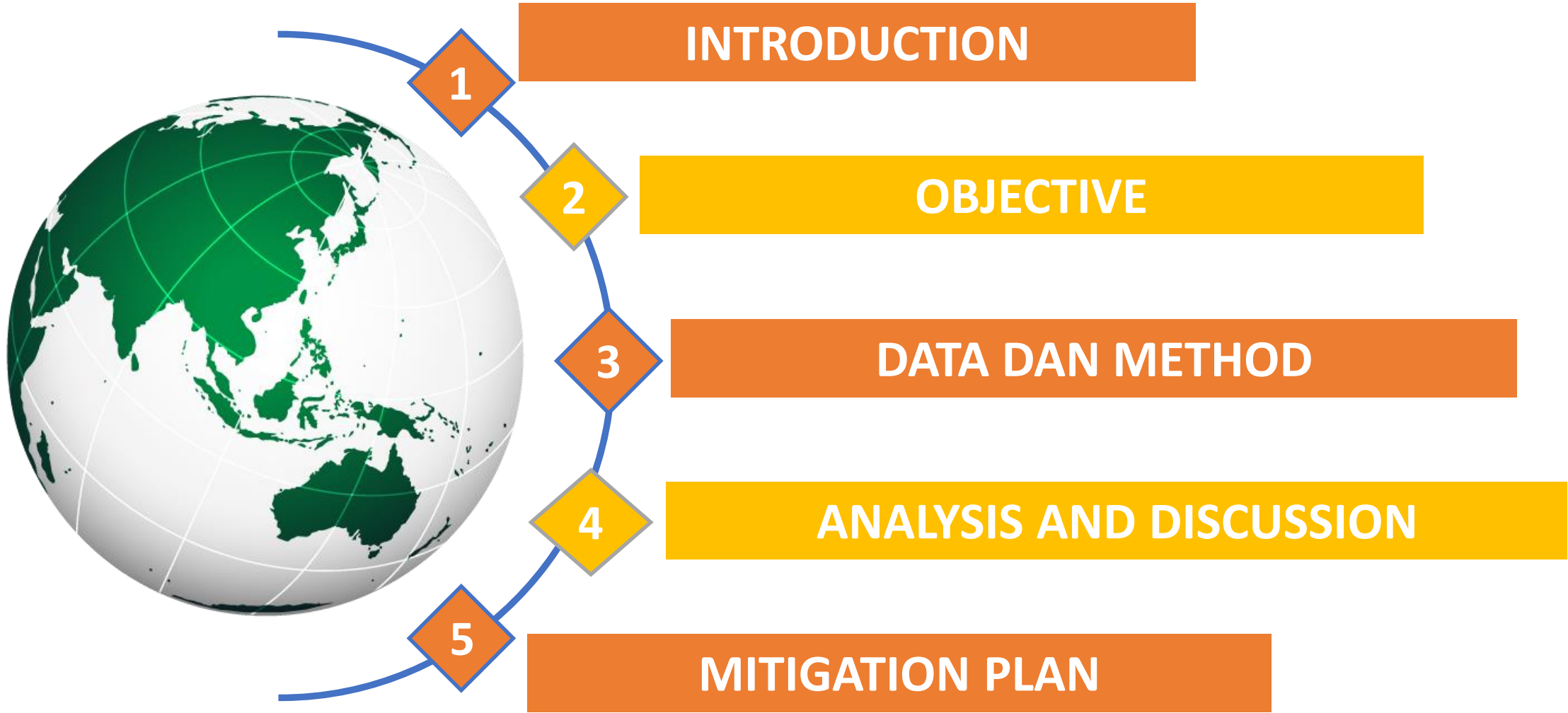


THE CLIMATE COMFORT AND RISK ASSESSMENT FOR TOURISM IN BALI, INDONESIA

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INTRODUCTION

- Tourism is the main source of economic driving in Bali and unfortunately, it is one of the economic sectors that are mostly affected by climate conditions which tends to change.
- Moreover, since climate comfort could affect the pattern of tourist visits as well as tourist preferences, it is one of the key elements that must be considered to increase the number of tourists visiting.
- The Holiday Climate Index (HCI) highlight the significance of climate as a factor in sustaining the competitiveness of coastal and urban destinations.
- Humidex is a measure of how hot we feel, how the combined effects of warm temperatures and humidity are perceived

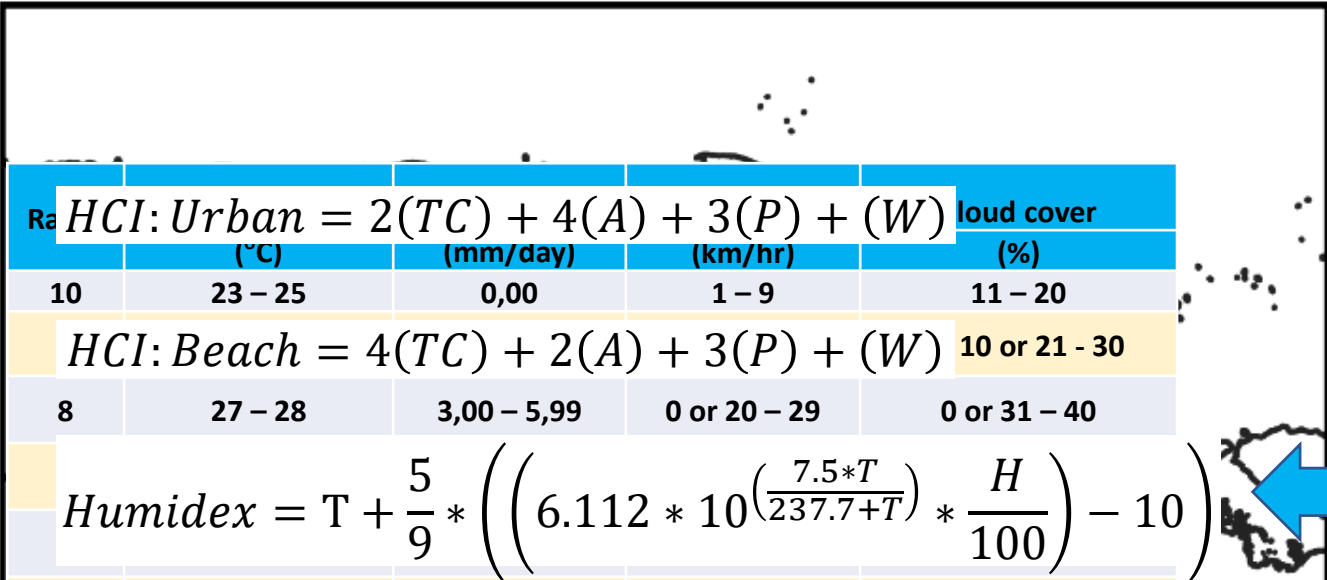
OBJECTIVE

- **Analyzing and mapping the comfort level of the tourism climate using Holiday Climate Index (HCI) and Humidity Index (Humidex).**
- **Finding the most comfortable month and the relationship between climate indicators and tourist visits**

DATA AND METHODS

4 Meteorological station and 20 Rain gauge :

- Maximum and Average temperature (°C)



HCI: Urban = $2(TC) + 4(A) + 3(P) + (W)$ **cloud cover**

	(°C)	(mm/day)	(km/hr)	(%)
10	23 – 25	0,00	1 – 9	11 – 20

HCI: Beach = $4(TC) + 2(A) + 3(P) + (W)$ **10 or 21 - 30**

8	27 – 28	3,00 – 5,99	0 or 20 – 29	0 or 31 – 40
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$$Humidex = T + \frac{5}{9} * \left(\left(6.112 * 10^{\left(\frac{7.5 * T}{237.7 + T} \right)} * \frac{H}{100} \right) - 10 \right)$$

TC: Thermal comfort (°C) 61 – 70

Tx : Maximum temperature (°C) 71 – 80

T : Average temperature (°C)

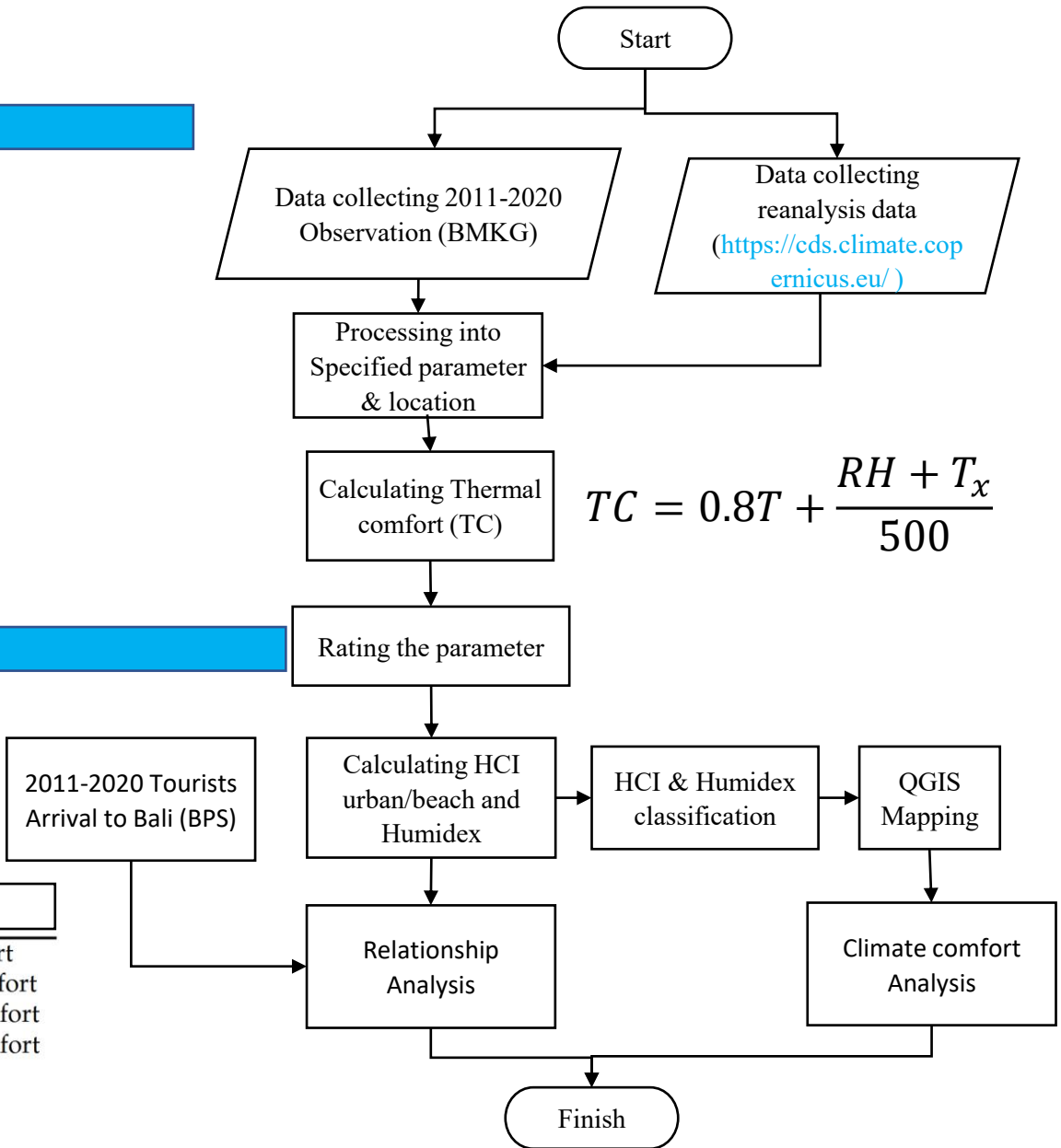
H : Relative humidity(%) 81 – 90

A : Cloud cover (%)

P : Precipitation (mm/day)

W : Wind speed (km/h)

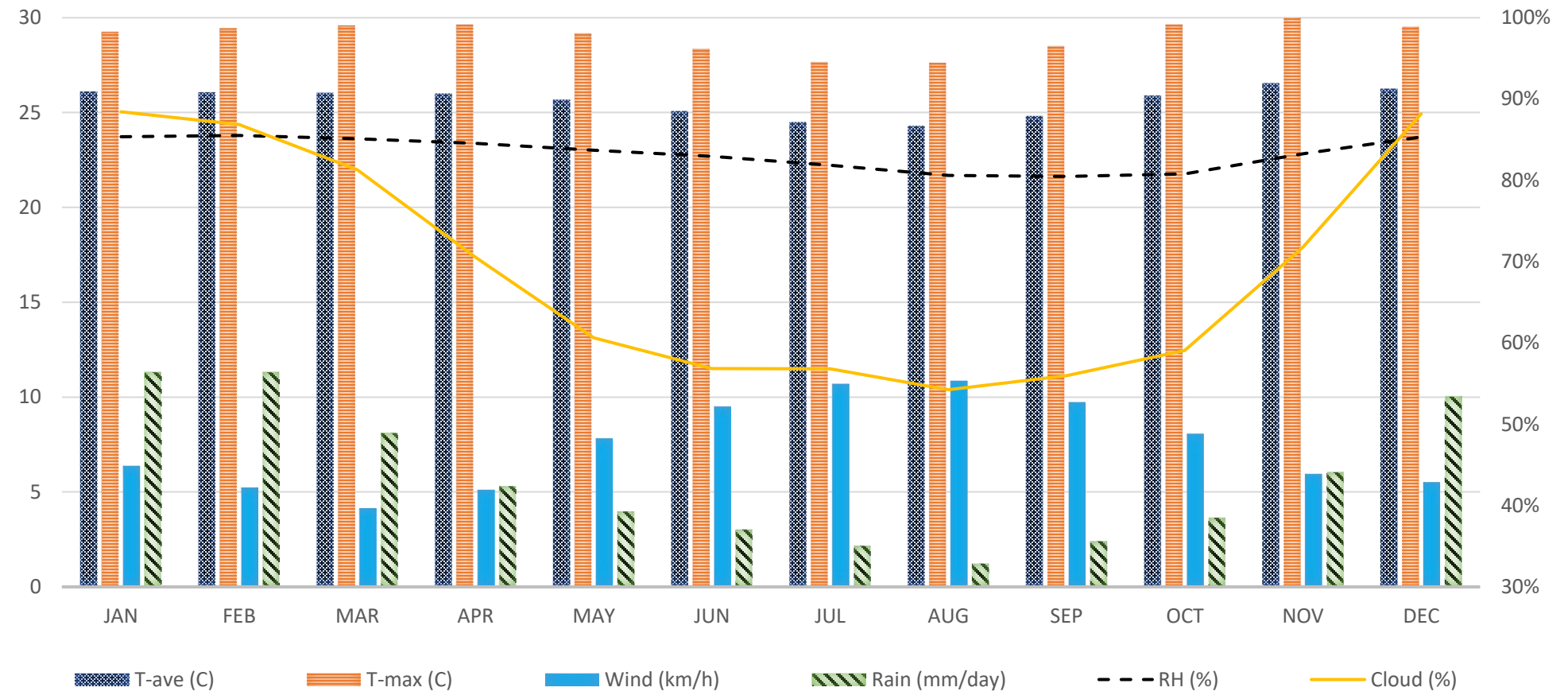
HCI		Humidex	
0–19	Dangerous	< 20	No discomfort
20–39	Unacceptable	20–29	Little discomfort
40–49	Marginal	30–39	Some discomfort
50–59	Acceptable	40–45	Great discomfort
60–69	Good	> 45	Dangerous
70–79	Very Good		
80–89	Excellent		
90–100	Ideal		



2011-2020 Tourists Arrival to Bali (BPS)

RESULTS AND ANALYSIS

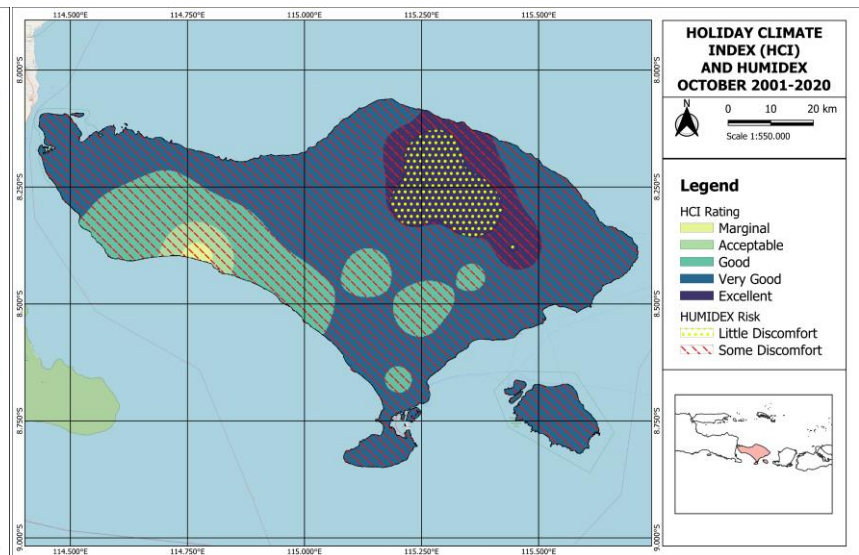
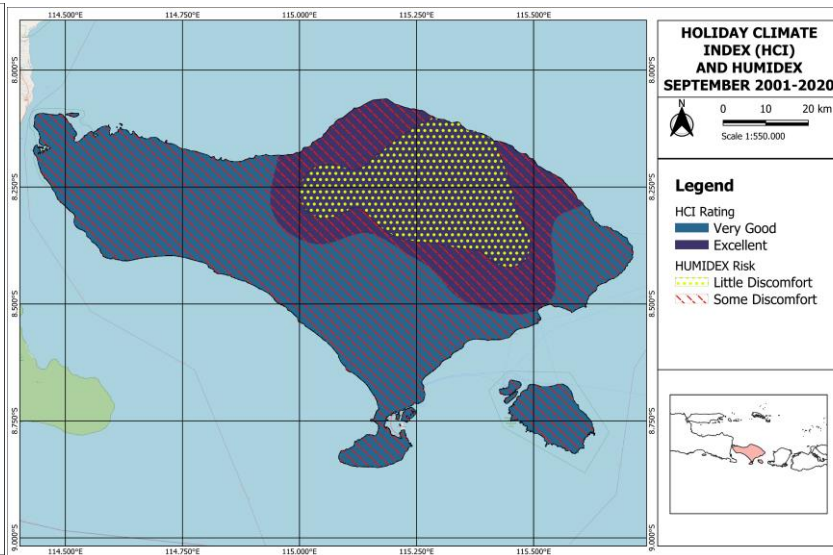
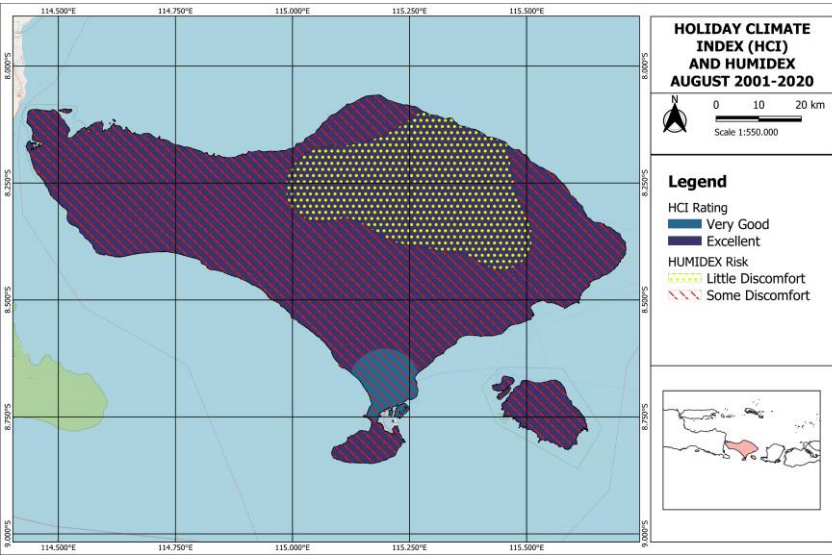
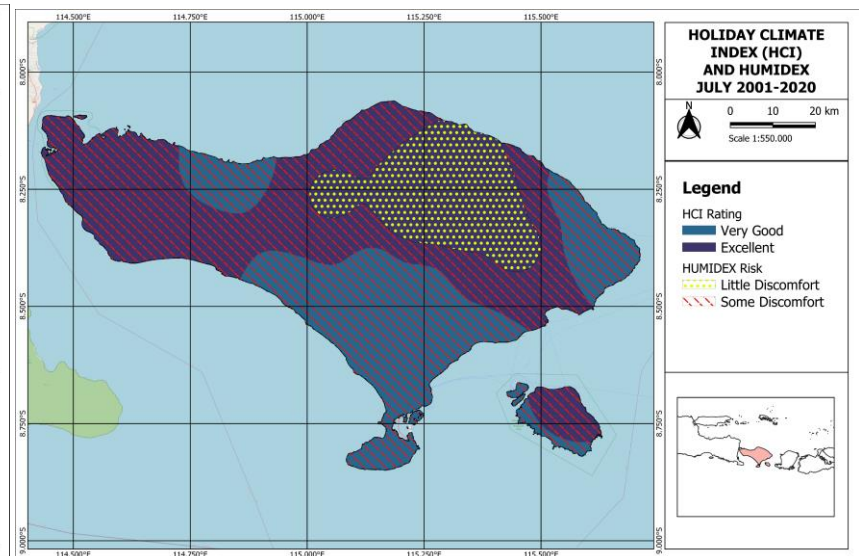
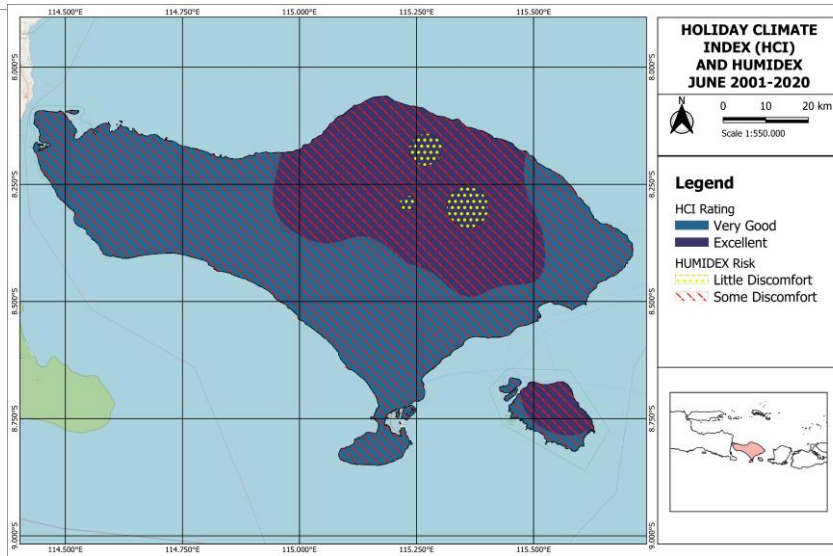
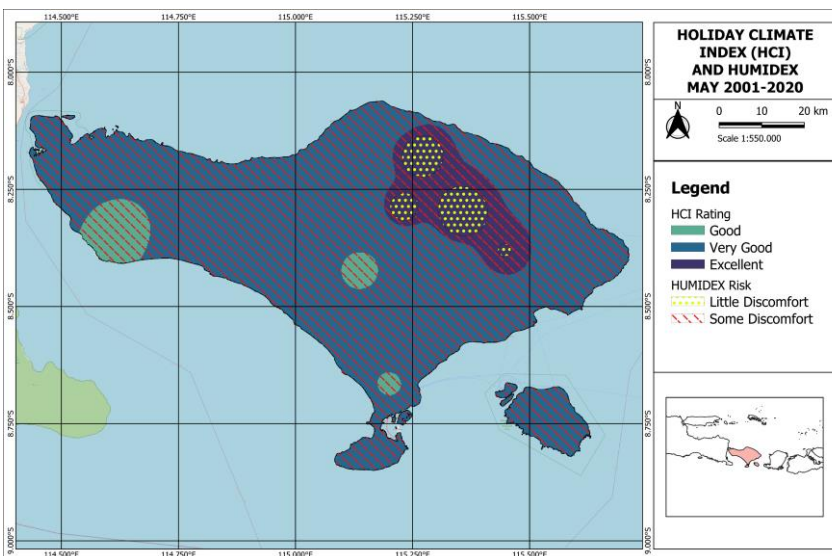
Climate parameter in Bali during 20 years periods (2001-2020)





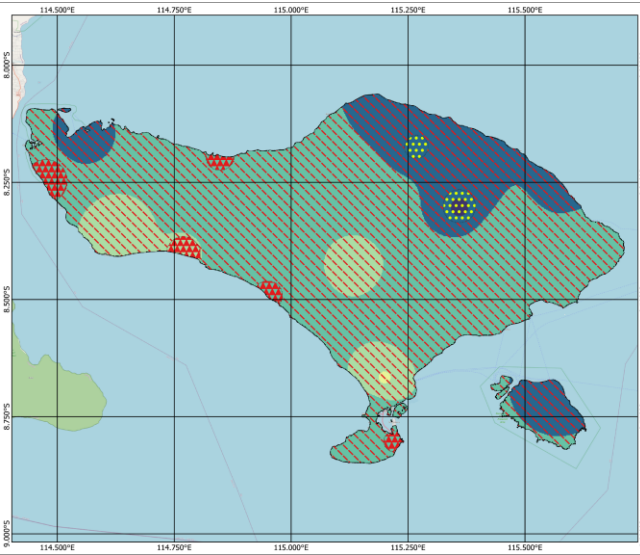
RESULTS AND ANALYSIS

Holiday Climate Index (HCI)



RESULTS AND ANALYSIS

Holiday Climate Index (HCI)



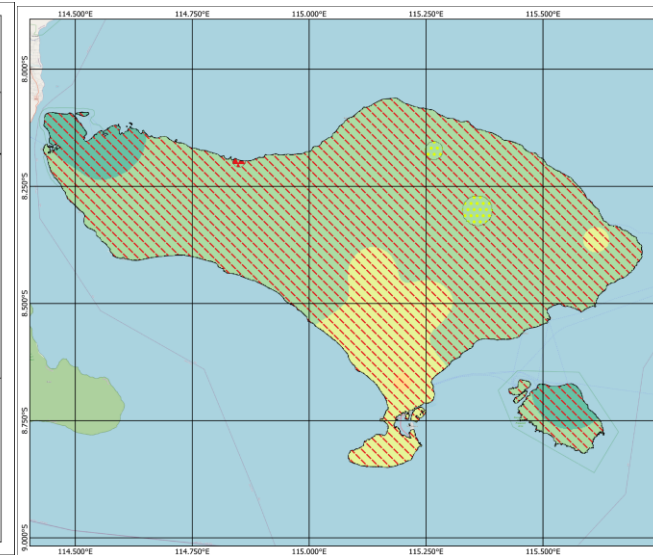
HOLIDAY CLIMATE INDEX (HCI) AND HUMIDEX NOVEMBER 2001-2020

0 10 20 km
Scale 1:550,000

Legend

HCI Rating
 Marginal
 Acceptable
 Good
 Very Good
 Excellent

HUMIDEX Risk
 Little Discomfort
 Some Discomfort
 Great discomfort



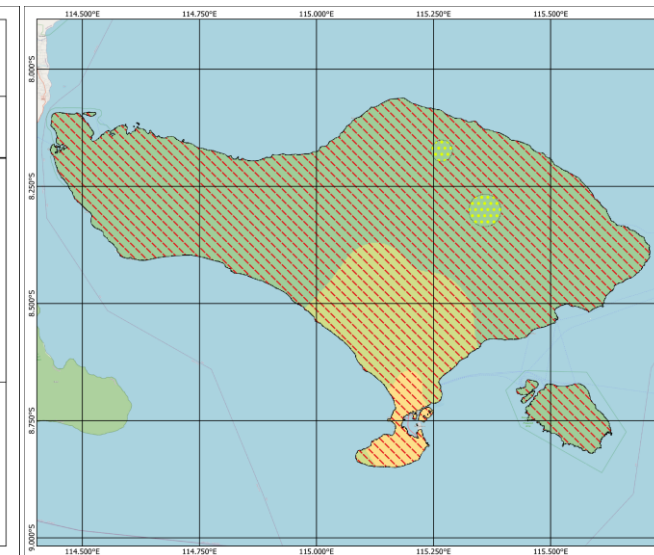
HOLIDAY CLIMATE INDEX (HCI) AND HUMIDEX DECEMBER 2001-2020

0 10 20 km
Scale 1:550,000

Legend

HCI Rating
 Unacceptable
 Marginal
 Acceptable
 Good

HUMIDEX Risk
 Little Discomfort
 Some Discomfort
 Great discomfort



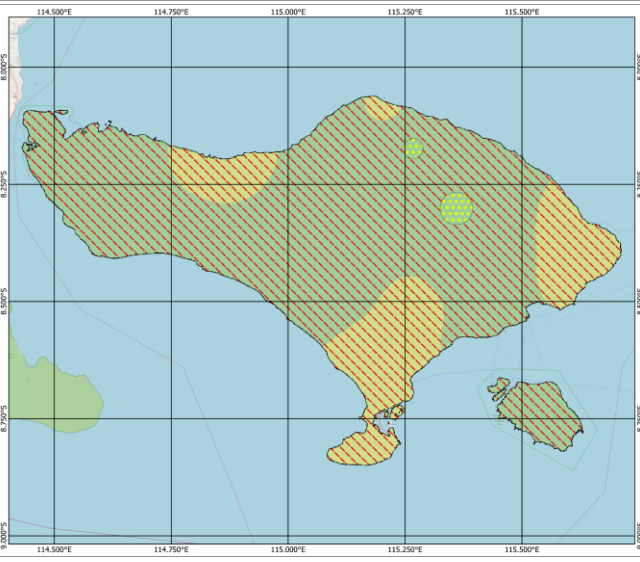
HOLIDAY CLIMATE INDEX (HCI) AND HUMIDEX JANUARY 2001-2020

0 10 20 km
Scale 1:550,000

Legend

HCI Rating
 Unacceptable
 Marginal
 Acceptable

HUMIDEX Risk
 Little Discomfort
 Some Discomfort



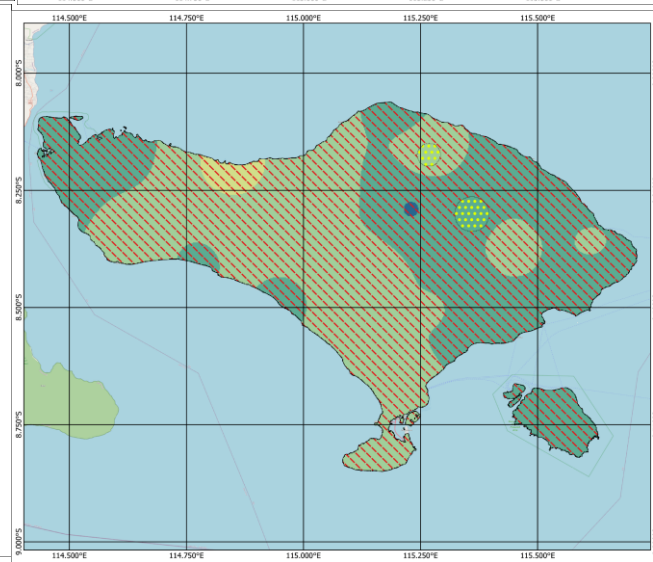
HOLIDAY CLIMATE INDEX (HCI) AND HUMIDEX FEBRUARY 2001-2020

0 10 20 km
Scale 1:550,000

Legend

HCI Rating
 Marginal
 Acceptable

HUMIDEX Risk
 Little Discomfort
 Some Discomfort



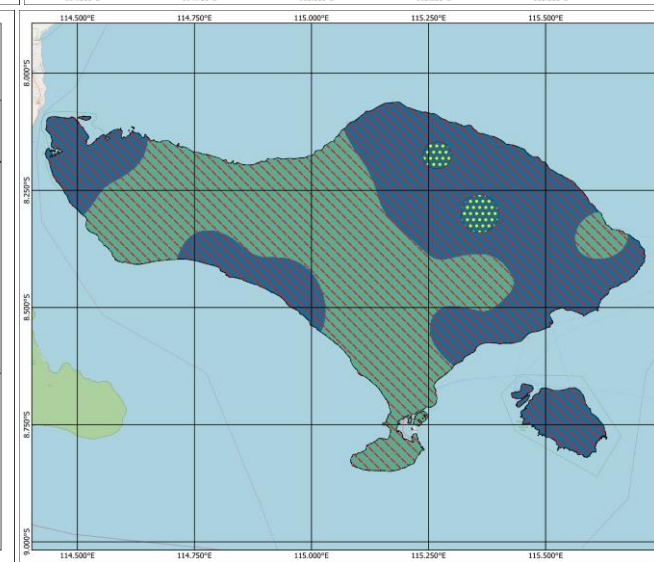
HOLIDAY CLIMATE INDEX (HCI) AND HUMIDEX MARCH 2001-2020

0 10 20 km
Scale 1:550,000

Legend

HCI Rating
 Marginal
 Acceptable
 Good
 Very Good

HUMIDEX Risk
 Little Discomfort
 Some Discomfort



HOLIDAY CLIMATE INDEX (HCI) AND HUMIDEX APRIL 2001-2020

0 10 20 km
Scale 1:550,000

Legend

HCI Rating
 Good
 Very Good

HUMIDEX Risk
 Little Discomfort
 Some Discomfort

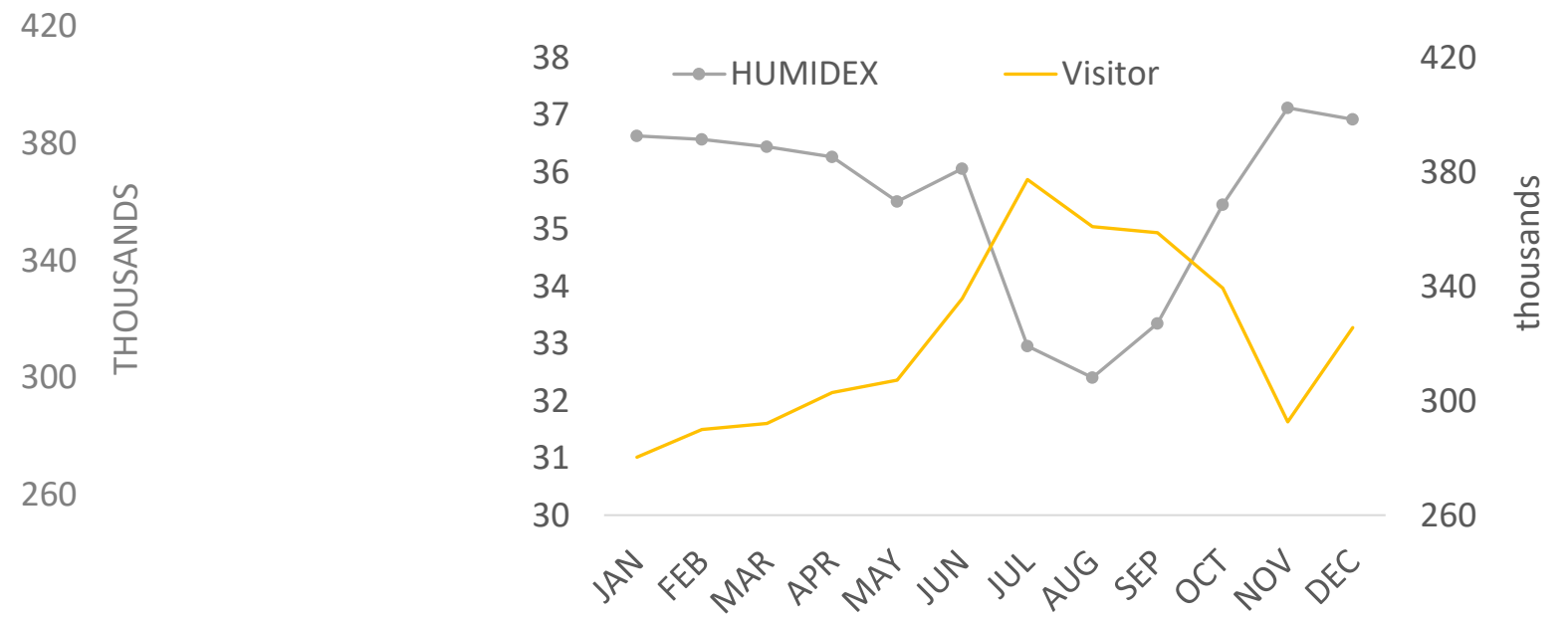
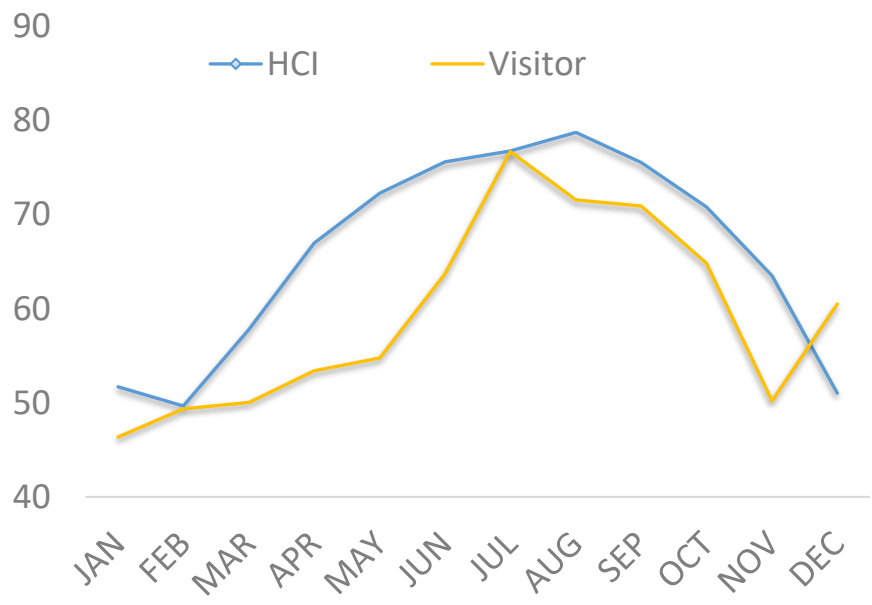


RESULTS AND ANALYSIS

CORRELATION

	HCI	HCI Beach	HUMIDEX
CORRELATION	0.733	0.728	-0.879

The relationship between HCI and Humidex with international visitors



CONCLUSION

- **The proper month to do urban tourism in Bali is in April to November and to do beach tourism is in May to October**
- **Little discomfort is in May to October**
- **High relationship between Monthly HCI and number of foreign visitor as well as Monthly Humidex and number of visitor but in negative pattern**
- **Overall humidex in range little discomfort to some discomfort can be anticipated by adequate water supply and aware of hourly temperature and relative humidity report**



1st WMO/WWRP

WEATHER & SOCIETY

CONFERENCE, February 28 - 11 March 2022

THANK YOU