

# The forecasting for dengue fever in Nakhon Si Thammarat Province, Thailand

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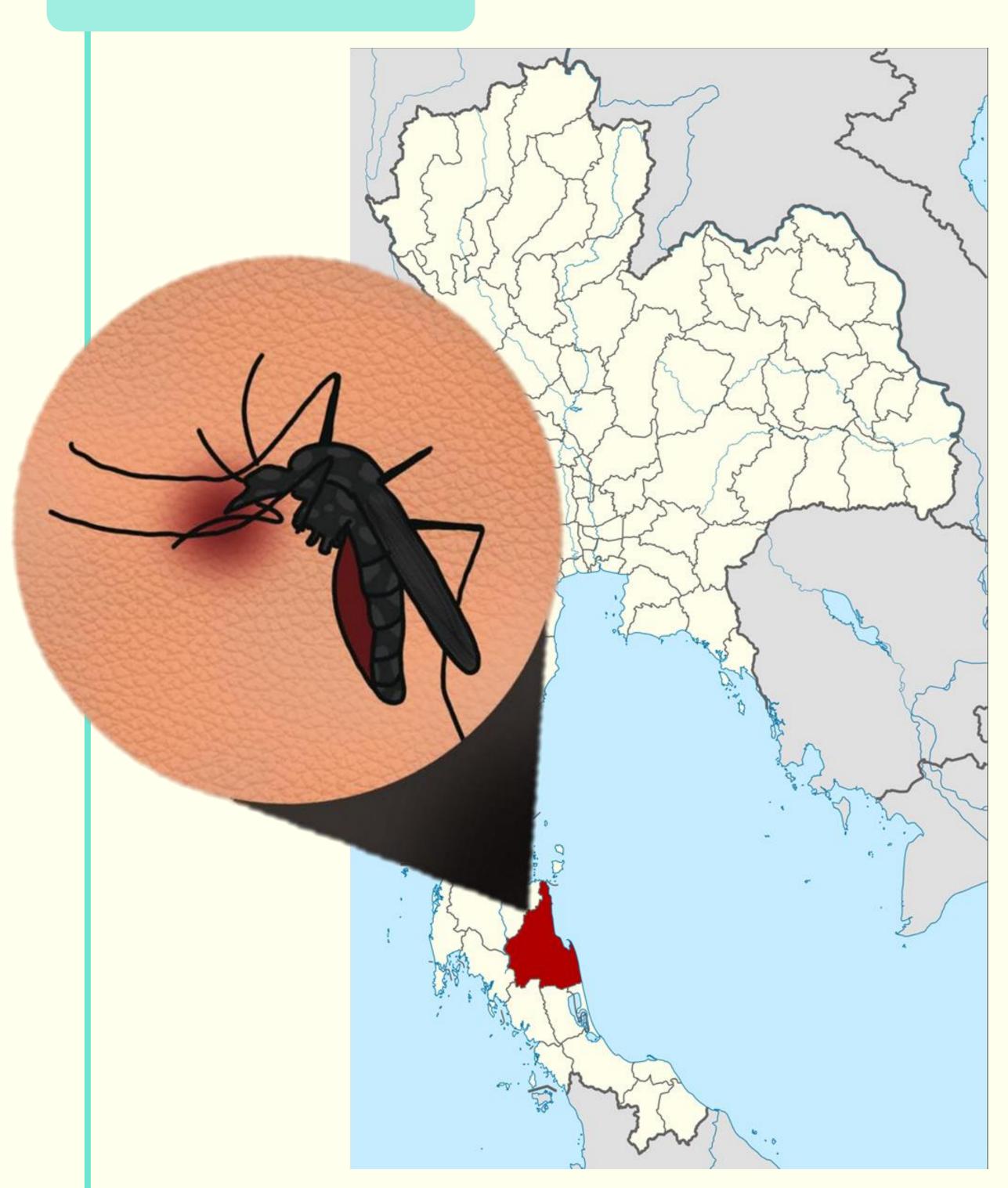


Global Learning and Observations to Benefit the Environment

#### Abstract

This project presents the forecast of dengue fever in Nakhon Si Thammarat Province, Thailand, by using Winters additive exponential smoothing and Winters' multiplicative exponential smoothing. The number of dengue fever data in Nakhon Si Thammarat are used since 2015 - 2019 and compared the accuracy of the forecast by MAD. The results of the study revealed that from all the methods of forecasting studied The most accurate method is the Winters' additive exponential smoothing method, with the forecasting equation as follows: F<sub>t+m</sub> = 214.9673221+1.893106655m+S t-L+m

#### Introduction

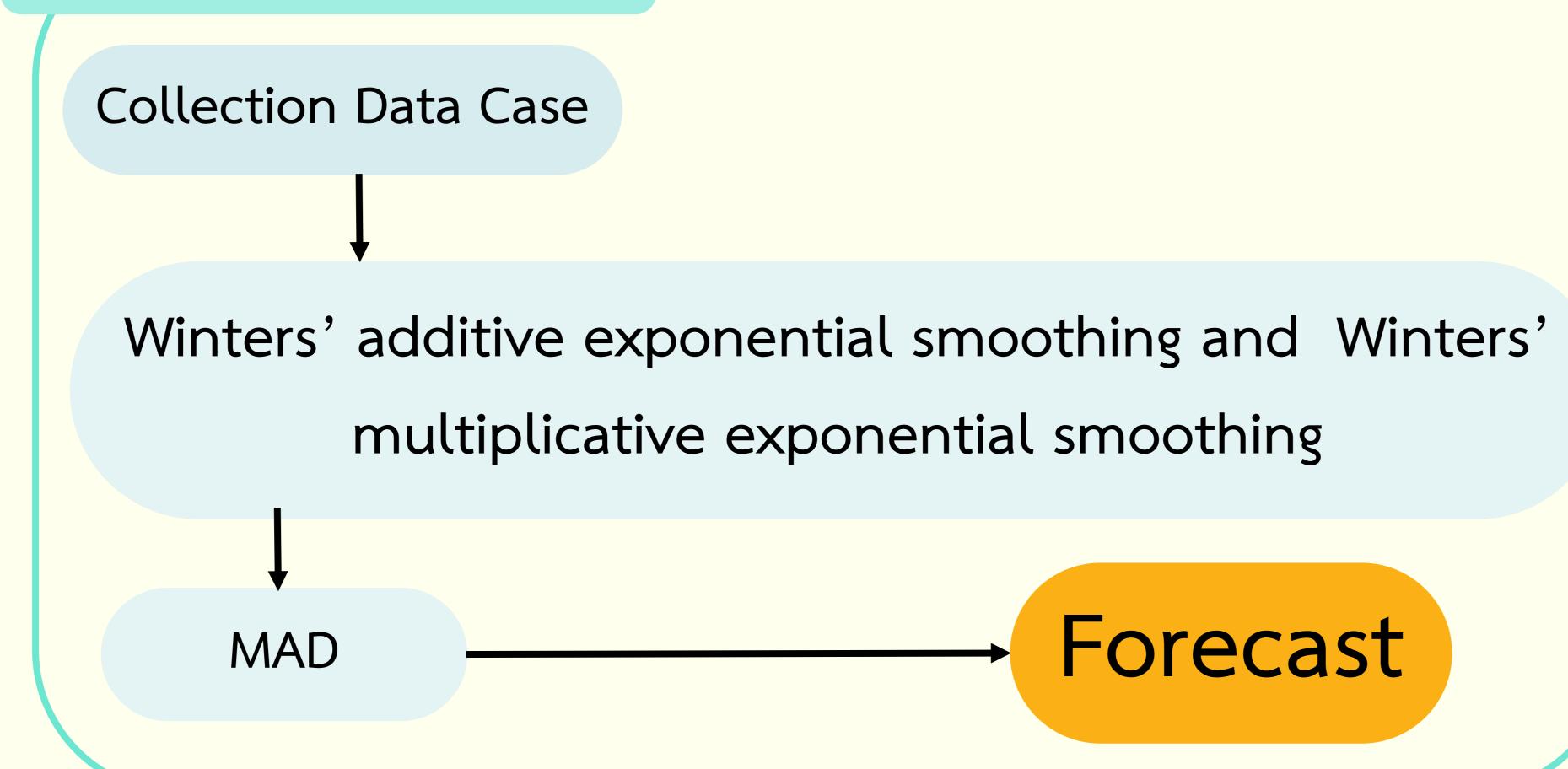


**Figure 1.** Map of Thailand and study site at Nakhon Si Thammarat Province, Thailand. (8° 26' 24" N, 99° 59' 7" E)

#### Research Question

Forecast Winters' additive exponential smoothing method is more accurate than Forecast Winters' multiplicative exponential smoothing method.

## Research Methods



#### Results

Forecasting results form Winters' additive exponential smoothing method, form can be obtained as follows:

 $F_{t+m} = 214.9673221 + 1.893106655m + S_{t-L+m}$  Forecasting results form Winters' multiplicative exponential smoothing method , form can be obtained as follows:

 $F_{t+m} = 266.3433649 - 3.067346384m + S_{t-L+m}$ 

**Table 1.** the results of the MAD value of the forecast.

Method	MAD
Winters' additive exponential smoothing	174.2111
Winters' multiplicative exponential smoothing	179.5290

# Bibliography

WHO. 2017. What is dengue and how is it treated? (2017).

Anna L. Buczak and team. (2018). Ensemble method for dengue prediction.

Suphawan Phromphera. (2013). Time Series Model in Forecasting Dengue Haemorrhagic Fever Disease in Nakhon Si Thammarat.

The comparing of forecast data with the actual data as shown in the figure (2) (3) below.

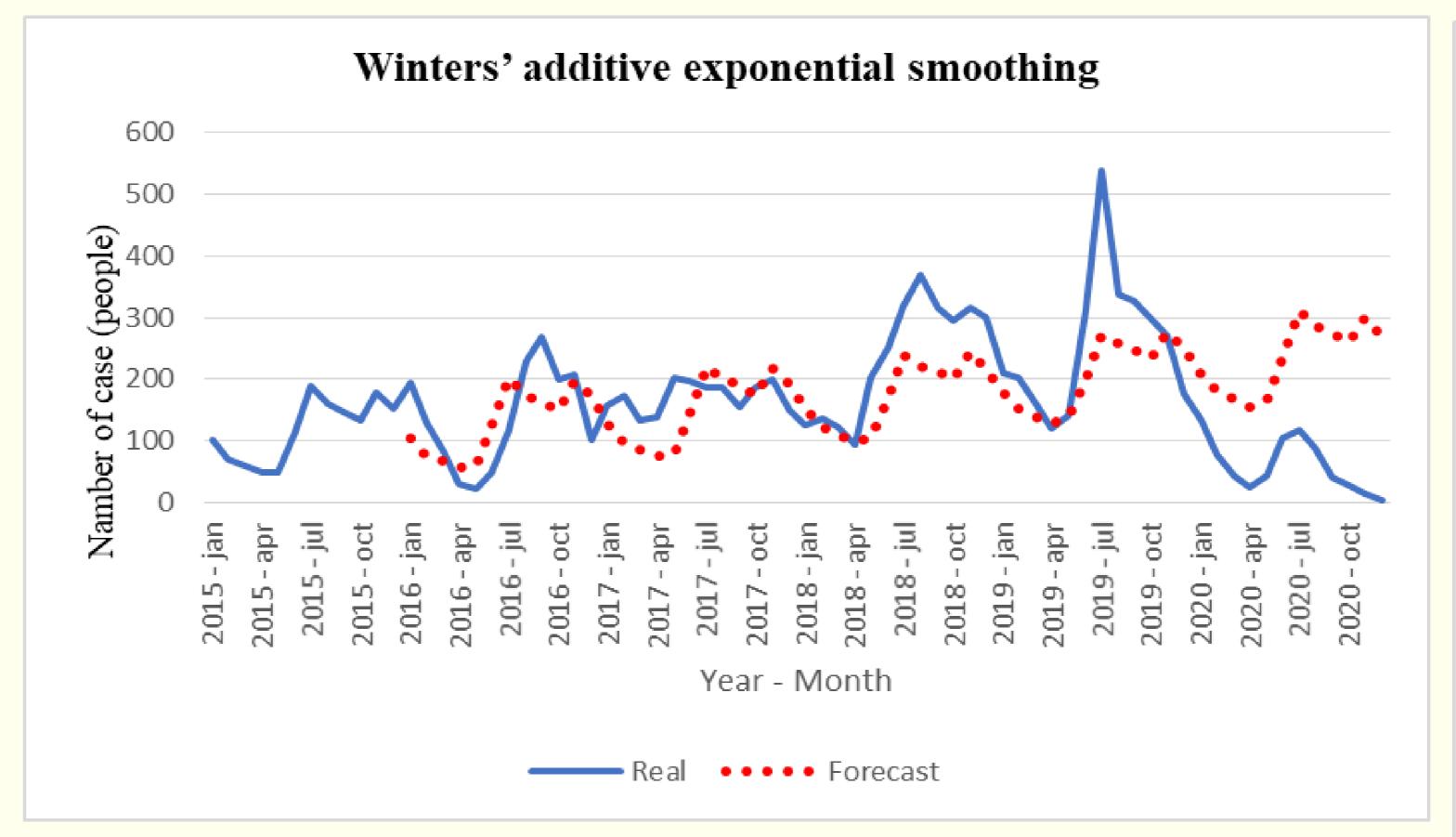


Figure 2. The graph shows the number of dengue cases.

Nakhon Si Thammarat Province, Thailand Since the year.

2015 to 2019 and forecast of the number of dengue cases

Nakhon Si Thammarat Province, Thailand year 2020

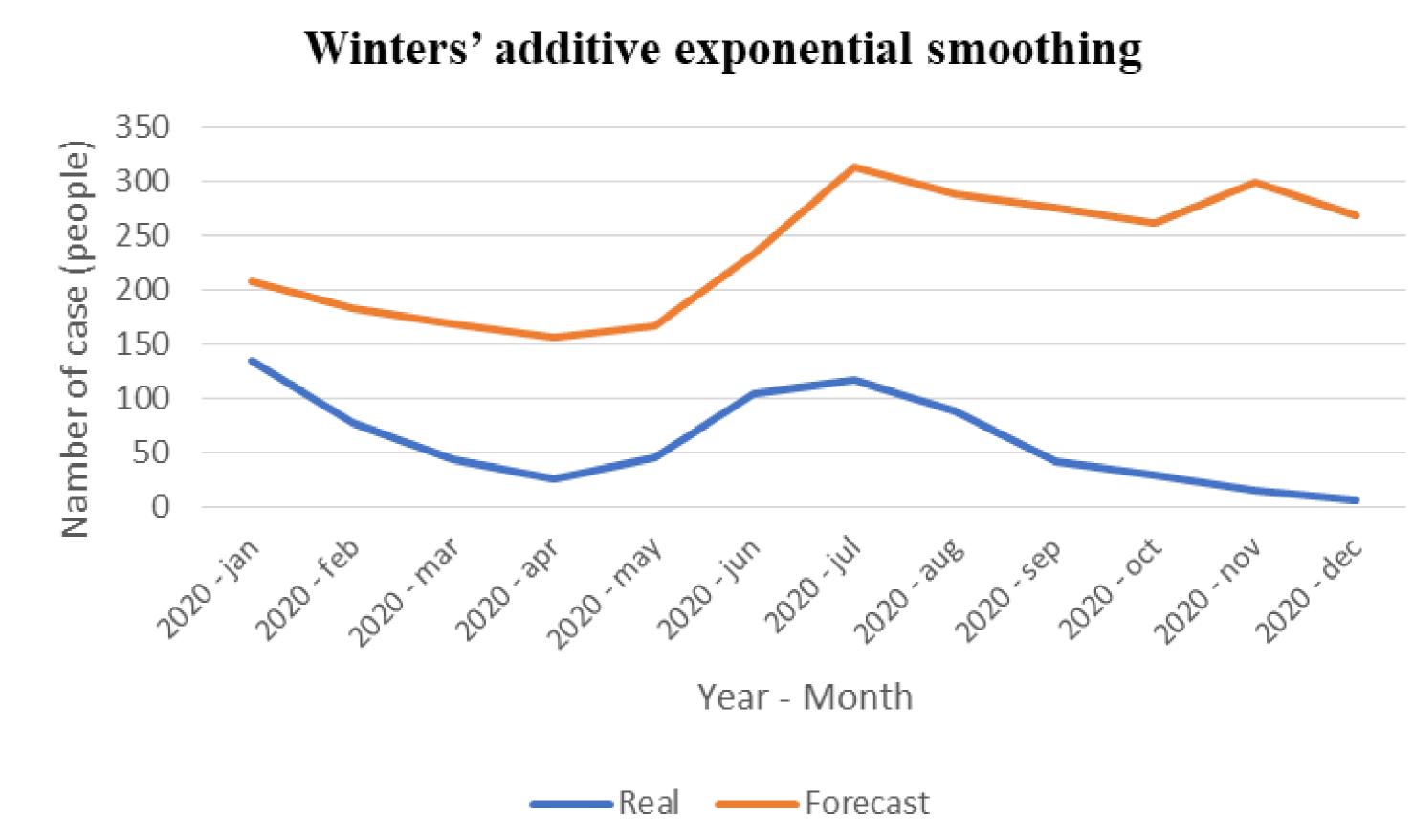


Figure 3. The number of dengue cases in Nakhon Si Thammarat Province Year 2020 and forecast of dengue cases Nakhon Si Thammarat Province, Year 2020.

#### Discussion

The study found that the number of dengue fever cases Nakhon Si Thammarat Province in the year 2020, there will be a decrease in the number of cases until April. Then the number of cases gradually increased in July and decreased in the following month, which is consistent with forecast, but some cases the actual number of patients was less than the predicted number. This could be due to the 2020 coronavirus outbreak (COVID-19), causing a lockdown across Thailand. People meet is dwindling compared to 2019, and rain effect in the November. Until the floods throughout Nakhon Si Tham Province, which two factors resulted in the number of dengue fever cases decreased and did not meet the forecast number.