

SIIC086

THE TIME SERIES STUDY ON THE TEMPERATURE EFFECT OVER PENANG ISLAND USING GIOVANNI

Kamal Fiqre bin Md Kamaludin¹, Dr. Muzafa bin Jumidali^{2,*} and Fathinul Najib bin Ahmad Sa'ad³

¹*Faculty of Chemical Engineering, Universiti Teknologi MARA, 13500 Permatang Pauh, Pulau Pinang*

^{2,3}*Faculty of Applied Science, Universiti Teknologi MARA, 13500 Permatang Pauh, Pulau Pinang*

**Corresponding author: mohdmuza433@uitm.edu.my (Supervisor)*

Abstract: NASA GIOVANNI is an advanced technology of remote sensing system. It is able to provide with Earth Science information within only a few minutes. The focus of this study is to obtain a reliable information via NASA GIOVANNI regarding the temperature trend in Penang Island, Malaysia, from year 2016 to 2018 and also to verify the validity and reliability of the data obtained from NASA GIOVANNI and therefore being able to replace with the conventional method of using AccuWeather. From the system, MODIS Aqua is selected as it is the most suitable satellite among other to capture the temperature reading at the desired area. The data obtained from AccuWeather are mostly accurate and clear even though there are several limitations regarding the parameter involved as it is quite general. Meanwhile the temperature data obtained from NASA GIOVANNI are more specific and detailed as it consists of several parameters. For example, NASA GIOVANNI is capable of accessing the sea surface and land surface temperature for the desired location. Apart from that, NASA GIOVANNI also able to separate between daytime and nighttime temperature data. After obtaining both data from NASA GIOVANNI and AccuWeather, an effective comparison is made via cross validation or to be exact, linear regression. From the graph of linear regression, R-Squared value can be calculated and hence can determine the correlation of both data. From the R-Squared calculations, the values calculated are 0.75 for year 2016, 0.65 for year 2017 and 0.71 for year 2018. According to the R-Squared value, it is concluded that the temperature data from NASA GIOVANNI is having a positive and strong correlation with AccuWeather as the values are exceeding 0.5 for each year. Therefore, the temperature data via NASA GIOVANNI is possible to obtained and also the obtained temperature data are almost as accurate as AccuWeather

Keywords: NASA GIOVANNI, AccuWeather, time series study, linear regression, MODIS Aqua

Results:

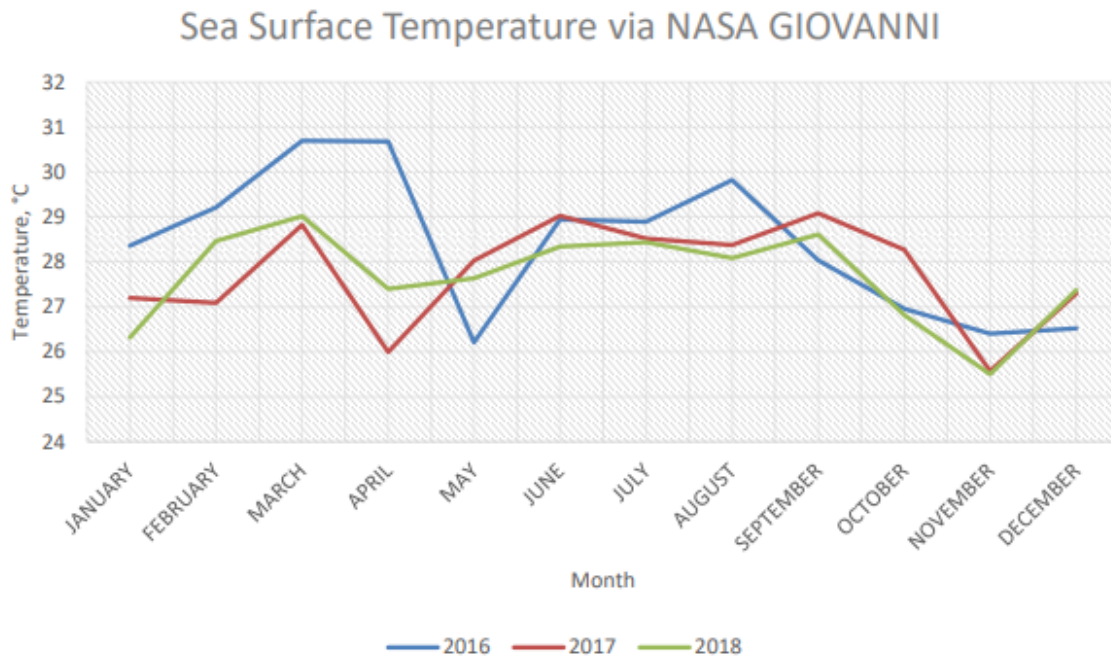


Figure 1: Sea Surface Temperature via NASA GIOVANNI

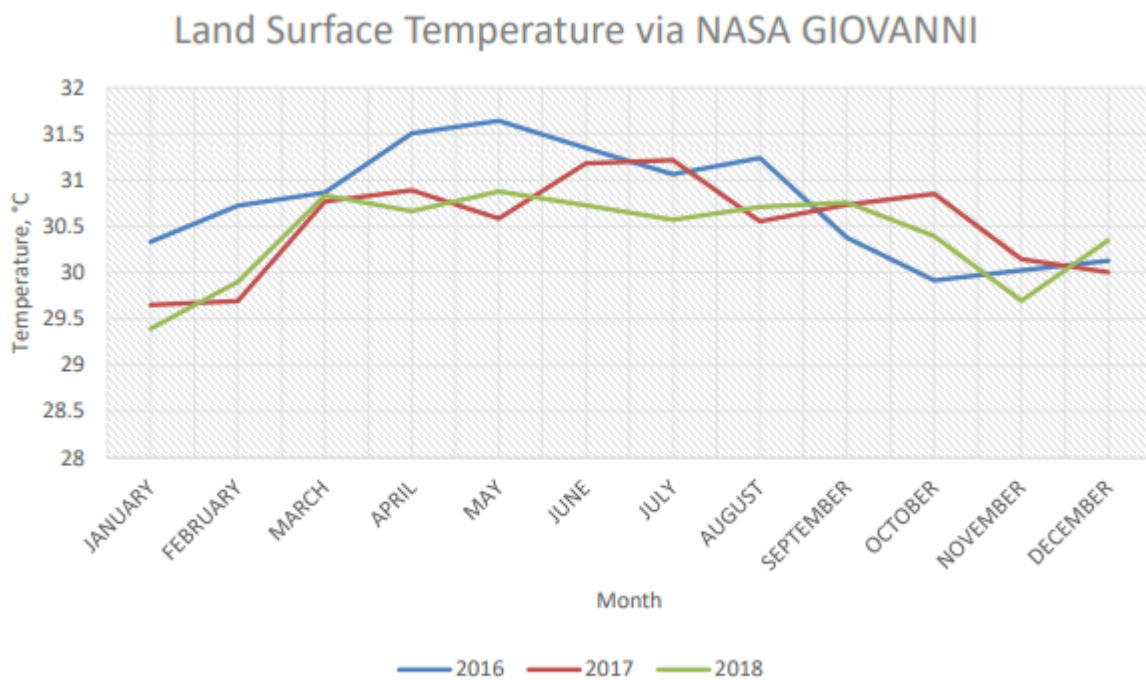


Figure 2: Land Surface Temperature via NASA GIOVANNI

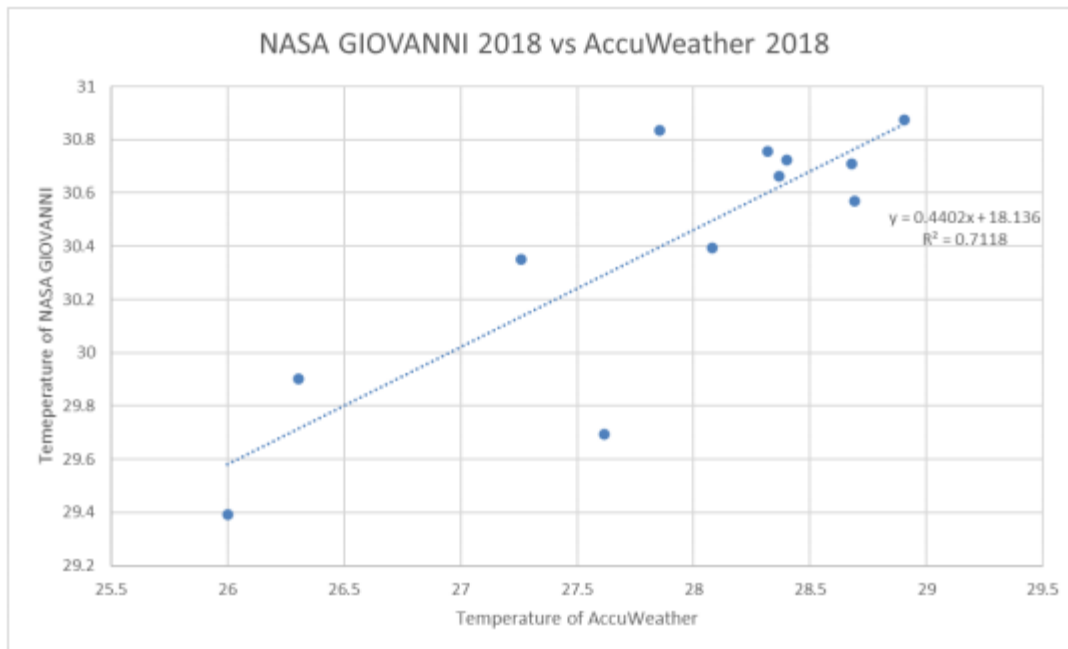


Figure 6: Linear Regression in 2018

Conclusion: Data from NASA GIOVANNI and AccuWeather are obtained, and the temperature profile for each year are analyzed. Both of the data need to be cross-validated with effective and unbiased comparison. Therefore, a simple linear regression method is chosen as is the easy and result are trusted and unbiased. From the line graph, the R2 value is interpreted, and the correlations for both data can be concluded. The R2 values are 0.7531, 0.6452 and 0.7118 for the year 2016, 2017 and 2018, respectively. The value for each year is exceeding 0.5, which shows that the data obtained from NASA GIOVANNI are having a positive and strong correlation with AccuWeather for each year.