I. INTRODUCTION

Sea level rise is a phenomenon that causes the sea level to rise to some extent, which can cause various kinds of problems such as a flood in a residential area close to the beach. During the 1961 to 2003 period, the average rise estimation of the global mean sea-level is 1.8 ± 0.5 mm per year, and the rise accelerated along the mid 19th - the mid 20th centuries [1].

With the development of technology and science, now we can use many data to make some models to forecast the future tidal level, which is very important for an island country like Indonesia [2]. Nowadays, there are many studies and experiments about methods and models to predict the tidal level's future value based on time-series data. For example, Prashant K. Srivastava et al. used the exponential leveling spatial state model and the ARIMA method to predict the sea-level rise in Arabi [3]. Sepideh Karimi, Ozgur Kisi, et al. used Neuro-fuzzy techniques and neural networks to predict the rise of sea level in Darwin port in Australia [4]. Ghorbani, Mohammad Ali, et al. compared the performance of genetic programming methods with ANN (artificial neural networks) to predict sea-level rise [5].

There are many forecasting methods, such as a statistical method like Holt-Winters Exponential Smoothing, ARIMA, SARIMA, and Deep Learning methods, by using the help of Artificial Intelligence (AI). The Holt-Winter Exponential Smoothing widely used to forecast business data that contain trends and seasonality. Autoregressive Integrated Moving Average (ARIMA) and Seasonal-Autoregressive Integrated
Moving Average (SARIMA) is a model that comes from the combination of the autoregressive (AR) and moving average (MA) models approach. The predicted value from this method result highly depends on the historical values and moving average. This method also assumes that the data is stationary, which means the mean and variance of the data do not change in time, and future value results generated from SARIMA got another aspect that needs to be considered, and that is the seasonality of the data [6].

Like ARIMA and SARIMA, the Holt-Winters method is also sensitive to unusual events or outliers. The outliers can affect the smoothing values since they depend on the past and the current data. However, before selecting which method to choose, we must check whether there are particular behavioral components present within the time-series data, such as a trend seasonality [7]. The content of this paper will discuss the comparison performances of Holt-Winters Exponential Smoothing vs. ARIMA and SARIMA forecasting method to forecast Cilacap sea level rise seventh days ahead by comparing their error.