ABSTRACT

This thesis has three objectives: (1) to assess the accuracy of the tide table at Pattani by comparison with direct observation data, (2) to produce effective graphical displays of high and low tide levels and times of occurrence at Pattani and Songkhla, and (3) to investigate the nature of (a) the series of times of occurrence and (b) the series of heights of high and low tides at Pattani and Songkhla.

The direct observation data were recorded by the staff and students in the Faculty of Science and Technology at Pattani Bay in May-June 1996 and the tide tables were created by the Hydrographic Department, Royal Thai Navy.

Graphical and statistical modelling are undertaken using time series plots and time series analysis.

From this study, the direct observation data fit the data from the tide table except the observed height of low tide was lower. The times of occurrence of high and low tides, and the high tide levels were approximately the same. When we compare the successive high and low tides at Pattani and Songkhla by using effective graphical displays, there is a strong seasonal effect, with the water levels lower in July than in January and December. When the nature of the series of tide occurrence was investigated using time series analysis, it is found that almost all of the fitted models consist of five harmonics at frequencies 12, 13, 24, 25 and 26. These correspond to the movement of the moon around the earth. Finally, when the series of heights is modelled using the same method, it is found that all of the fitted models consist of six harmonics at frequencies 1, 2, 11, 13, 14 and 25. The first and the second harmonics correspond to the earth’s orbit around the sun. Other harmonics correspond to the movement of the moon around the earth.
The goodness of fit for almost all of the models is good. The values of the r-squared are more than 0.9 except for the model of times of occurrence of the first high tide at Pattani and Songkhla, for which the r-squared is approximately 0.8.