CHAPTER 3

PRELIMINARY RESULTS

In this chapter, the results of the preliminary analysis are presented. These results may be classified as follows.

(a) Graphs of the data obtained by direct observation every 15 minutes at Pattani River Mouth on 25 May and 1 June, 1996; and comparison of these direct observation data with the data from the tide table.

(b) Comparison of high and low tide levels and times of occurrence at Pattani and Songkhla in 1996, based on the tide tables.

1. Comparison of direct observation data with tide table

Figure 8 shows measurements recorded by students in the Faculty of Science and Technology at Pattani River Mouth as part of a study of hydrographic data in Pattani Bay on 25 May and 1 June 1996. The water levels were actually measured at 5 minute intervals using an inverted 2-meter measuring tape attached to a vertical pole. Measurements at 15 minutes intervals were thus obtained by averaging three successive 5-minute recordings. Since there was no common origin for the water height measurements, the data were centred to have mean 0, then reversed in sign (because the measuring stick was upside down), and finally an amount of 50 cm was added ensuring that all the water height measurements are nonnegative.

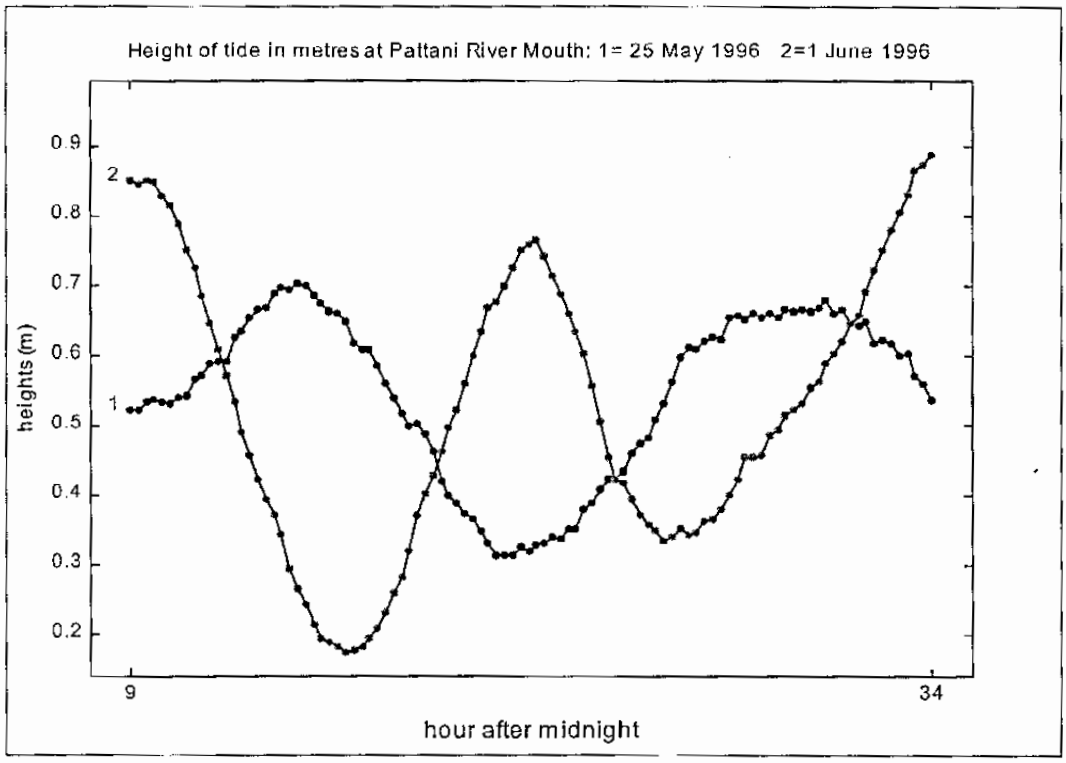

Figure 8: Tide heights at Pattani River Mouth for two 25-hour periods

According to Figure 8, the range of water in May 25 is less than the range of water in June 1. May 25 corresponds to a period when the sun and the moon were at right angles to each other. This is the neap tide period (Sa-nguantrup, 1989, page 126). One week later the sun and the moon were aligned, thus giving rise to stronger tidal forces, or spring tides.

An objective of our analysis is to assess the accuracy of the data in the tide table by comparison with direct measurement data and data from the tide tables on the same day at approximately the same place are compared. For the analysis of the data on 25 May and 1 June 1996, the results are shown in Figure 9. The graphs are aligned so that the peaks coincide.

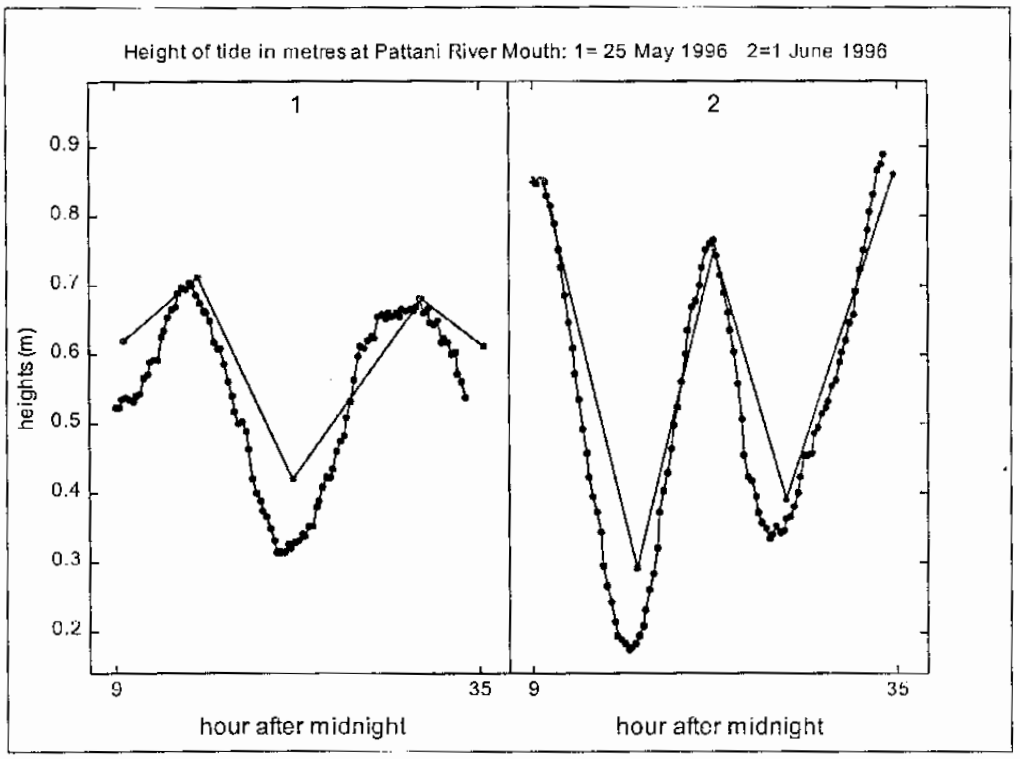

Figure 9: Tide heights from the Tide Tables and 15-minute direct measurements at Pattani River Mouth on 25 May and 1 June 1996

——•——tide table data; —•—•—direct observation data.

Clearly, the range of the direct observations is substantially greater (by approximately 15%) than that given in the tide table. However, the times at which the high and low tides occur are almost exactly the same as those given in the tide table.

On May 25, 1996 from the tide tables, the high tide levels were 71 cm and 68 cm respectively, compared with 68.7 cm and 68.0 cm, respectively, based on the direct observations.

On June 1, 1996 from the tide tables, the high tide levels were 85 cm, 75 cm and 86 cm respectively, compared with 85.1 cm, 76.5 cm and 88.7 cm respectively, from the direct observations.

However, the height of the lowest low water is definitely different from the height of low tide from the tide table, which is higher than the level of low tide from the measured data on both day.

On May 25, 1996 from the tide tables, the low tide level was 42 cm compared with 31.3 cm from the direct observations.

On June 1, 1996 from the tide tables, the low tide levels were 29 cm and 38 cm respectively, compared with 17.7 cm and 33.5 cm respectively, from the direct observations.

2. Comparison of high and low tides at Pattani and Songkhla

The objective of this analysis is to investigate, using effective graphs, the trends in the water levels and times of occurrence of the high and low tides at Pattani and Songkhla during 1996. Figure 10 and 11 show the levels for the first two months of 1996 during which there were 116 high and low tides at each location. There were thus 232 tides during 60 days, a semidiurnal pattern.

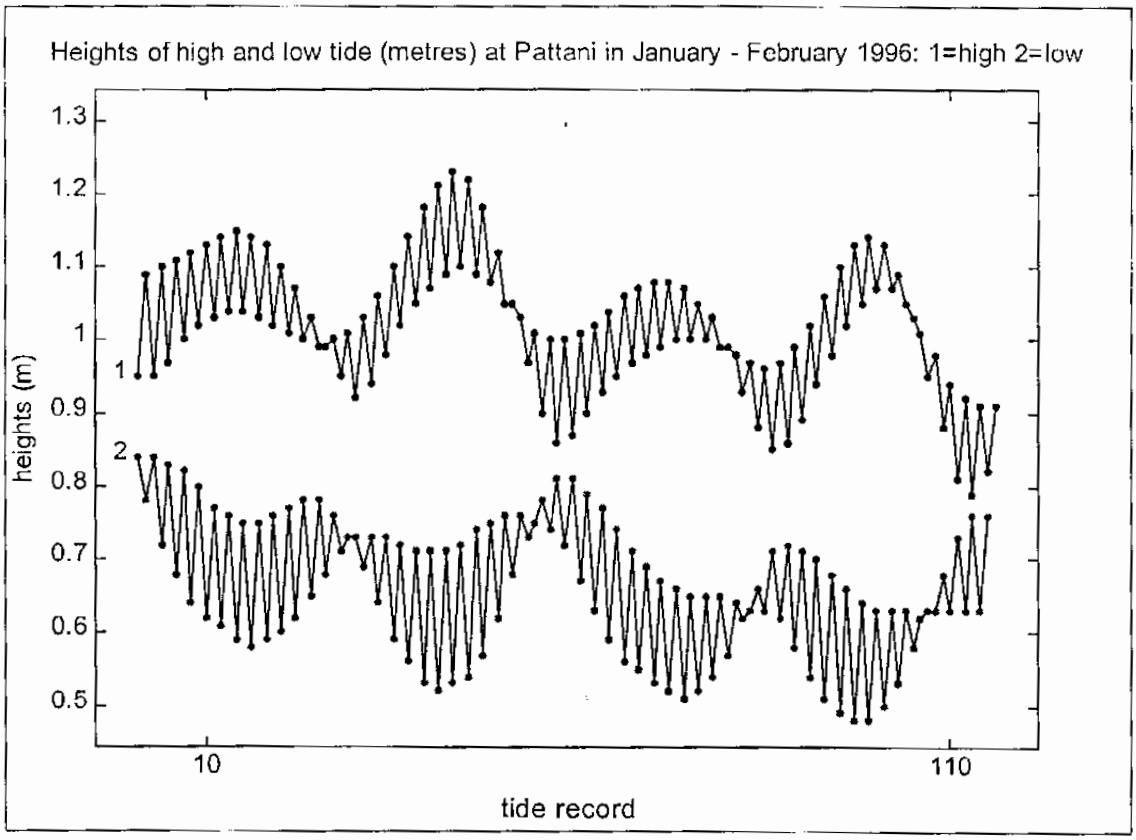

Figure 10: Heights of tides at Pattani during January and February 1996

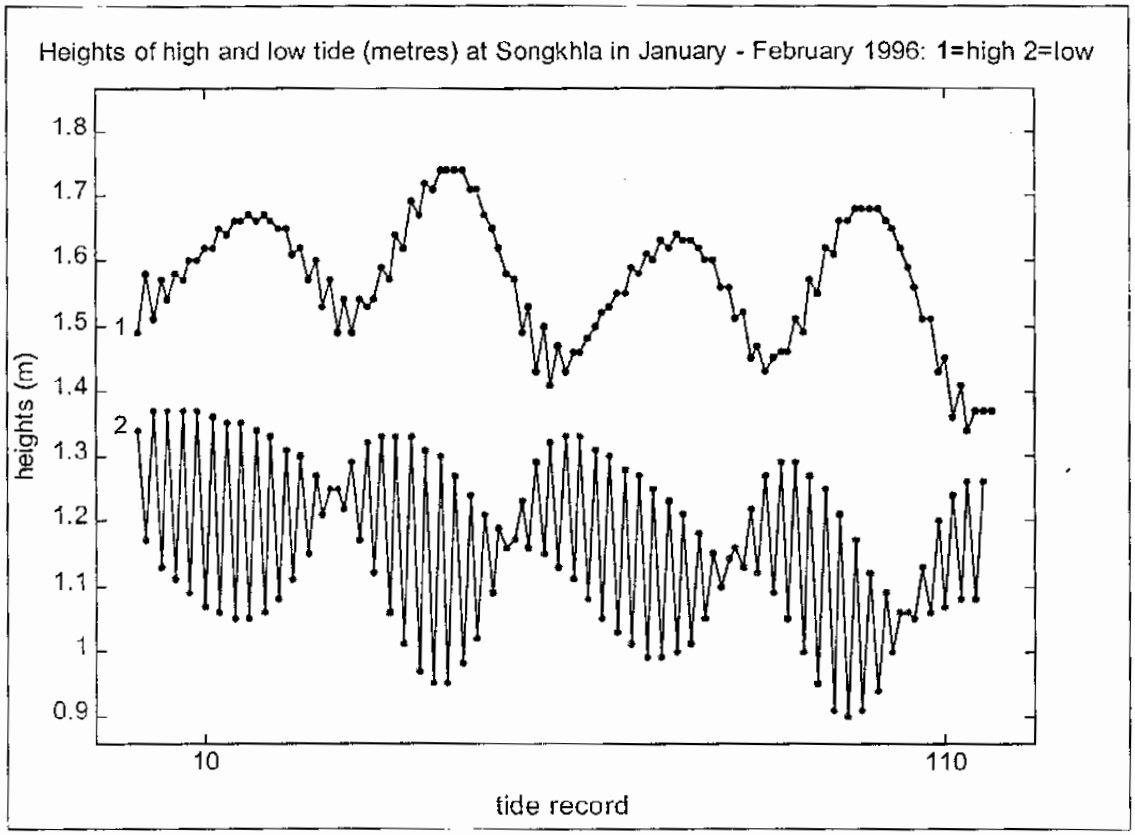

Figure 11: Heights of tides at Songkhla during January and February 1996

Figure 10 shows that both the high and low tides at Pattani alternate in pairs. Thus, if a high tide is higher than average the next high tide is lower than average, and if a high tide is lower than average the next high tide is higher than average, The successive low tides at Pattani show a similar pattern.

For Songkhla, Figure 11 shows a similar pattern to Pattani for the successive low tides, with an even greater variation. However the successive high tides at Songkhla show only a small degree of alienation from one high tide to the next.

Figures 12 and 13 show the levels for the whole of 1996, during which there were 707 high and low tides at each location. There were thus 1414 tides during 366 days, a semidiurnal pattern.

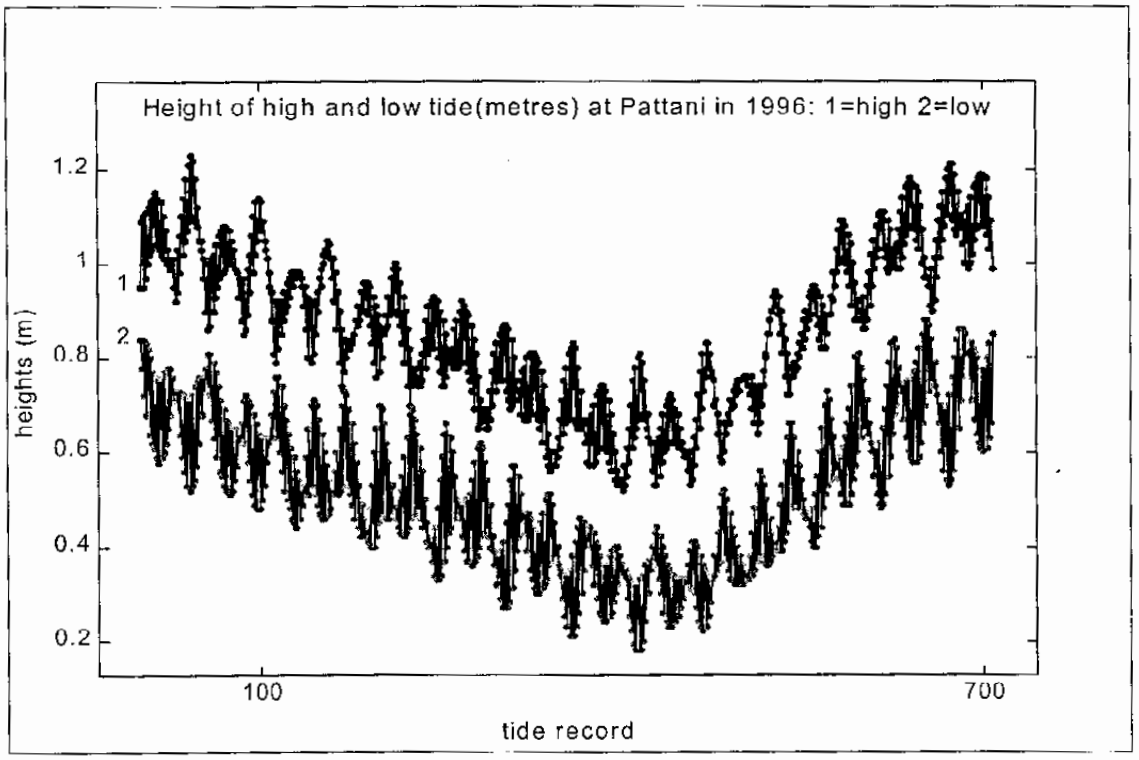

Figure 12: Heights of high and low tides at Pattani in 1996

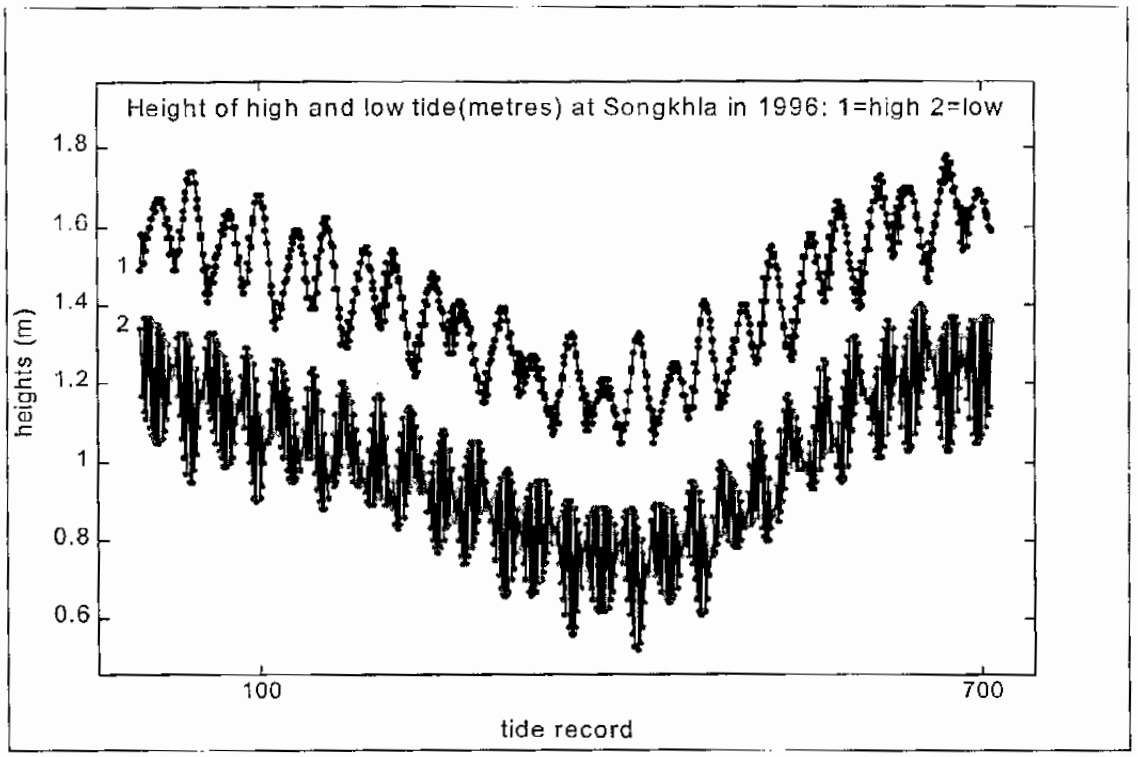

Figure 13: Heights of high and low tides at Songkhla in 1996

Figures 12 and 13 show a seasonal variation for both Pattani and Songkhla, with the water level approximately 40 cm lower in July than in January and December. This effect may be explained by the annual monsoon wind, which blows from the East in November-January, thus causing the water to be higher on the eastern side of the Malay peninsular at that time of year.

Figures 14 and 15 show the times of occurrence during the lunar day of the high and low tides for both Pattani and Songkhla.

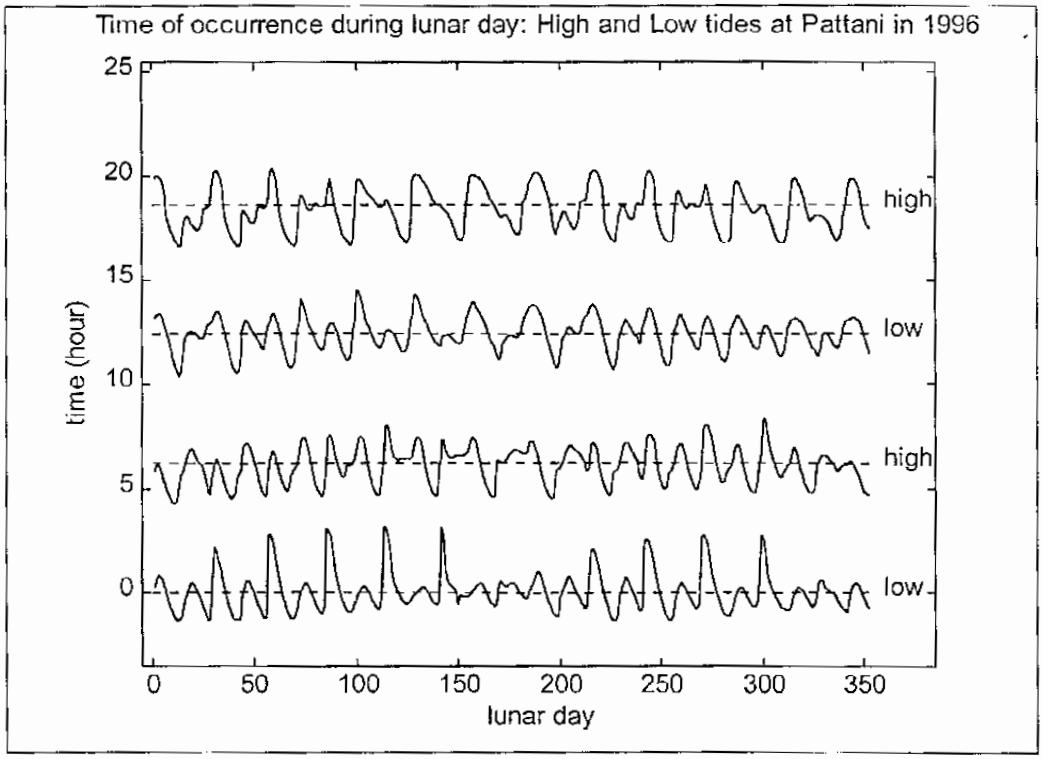

Figure 14 : Times of occurrence during lunar day of tides at Pattani in 1996.

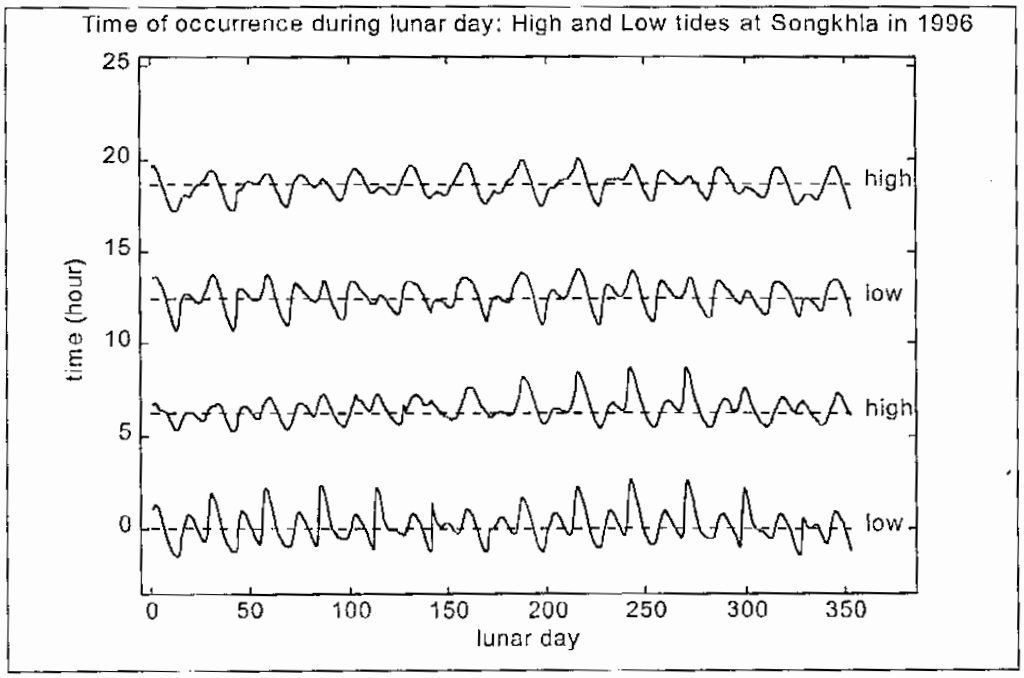

Figure 15 : Times of occurrence during lunar day of tides at Songkhla in 1996.

These times are measured with respect to a lunar day of 24 hours 50.47 minutes, the time taken by the earth to complete one rotation with respect to the moon. The origin is taken so that each lunar day begins, on average at a low tide and thus the next low tide occurs 12 hours and 25.24 minutes laters, while the high tides occur, on average at 6 hours and 18 minutes into the lunar day.

Note that the time of occurrence at each location fluctuates within an average of approximately 3 hours.