CHAPTER 1

INTRODUCTION

1.1 BACKGROUND

Malaysia covers the population about 26 millions of people and area of about 330,000 km². The average annual rainfall is estimated at 3000 mm and relative humidity is about 80% (Zainab Hashim, 2010). Peninsular Malaysia is exposed by the two monsoon winds which are blowing the moisture from different directions depending on the season and local convective rainfall at the low lands. Having 189 river basins throughout Malaysia, including Sabah and Sarawak, the rivers and their corridors of flood plains fulfill a variety of functions neither for human use nor the natural ecosystem itself. The basin receives a large amount of rainfall that will result for flash flood to the areas surrounding. North-East Monsoon that prevailing between November and February causes heavy rainfall for the east coast of Peninsular Malaysia including state of Kelantan, Terengganu and Pahang. Thus, some of area experienced more formation of clouds and heavy rainfall than typical (Malaysia Meteorology, 2013).

Figure 1.1 shows the maps of flood prone areas along Peninsular Malaysia which is the 10 number of stations were selected from the area in the red circle.
Kuantan River Basin is in the district of Kuantan at the north eastern end of Pahang State in Peninsular Malaysia. It is one of the important river basins in Pahang and covers an area of 1630 km$^2$ catchment area which started from forest reserved area in Mukim Ulu Kuantan through agricultural areas, Kuantan town (state capital of Pahang) towards the South China Sea. Kuantan River Basin consists of several important tributaries and these rivers drain the major rural, agricultural, urban and industrial areas of Kuantan District and discharge into South China Sea (MFM Nasir, 2012).

Kuantan is one of the flood prone areas identified in peninsular Malaysia. It covers area up to 2025 km$^2$. The location is in the state of Pahang and the main river basin is Kuantan River. This basin is responsible to drain water from correspond catchment area to the South China Sea. The rainy season which runs from October to March with North-East wind bringing heavy rain and often causing floods in the region, especially along the Kuantan River Basin and surrounding area. From November to March, the north-east monsoon elevates humidity to uncomfortable levels, with daily thunderstorms and similar weather. Monsoon rainfall and winds are caused by the sun

**Figure 1.1:** Flood Prone Areas along Peninsular Malaysia

Source: Drainage and Irrigation 2009
heating patterns to the land and ocean and sometimes are characterized by the geographical preferences and seasonality within that area (Pan et. al, 2011).

In the other hand, seasonal variations in climate are more evidently marked by rainfall temporal patterns. As the rainfall pattern keep on changing during recent years, the flood event is harder to be estimated. So, analysis based on recent rainfall will help in flood design estimation to reduce the impact such analysis includes development of rainfall temporal pattern which is used in designing flood event and estimation.

1.2 PROBLEM STATEMENT

In the past years different parts of the Kuantan River basin have been affected by problems related to flooding. Many people dislocated from their place and loss their property. Also, government and private properties have been damaged causing huge impact on the country’s economy. The main reason for this catastrophe is the lack of appropriate knowledge about the river basin hydrology. The rapid industrialization and urbanization has led to deforestation and un-planned land use altering the rainfall-runoff relationship.

In Malaysia, temporal rainfall pattern for Peninsular Malaysia is available and published in Chapter 2 of Malaysian Urban Storm Water Management Manual Second Edition (MSMA 2) which is updated data from Malaysian Urban Storm Water Management Manual First Edition (MSMA 1). The patterns were prepared for 9 standard durations, 15 min, 30 min, 60 min, 180 min, 6 hour, 12 hour, 24 hour, 48 hour, and 72 hours for five regions. Data collected to establish the patterns were sampled from twenty-four rainfall stations located in different parts of Peninsular Malaysia. However, the data available is too short and was not updated after 2010.

Besides that, the data from MSMA 2 is stated specific by region but we wish to get the data from each station at Kuantan River Basin. This means that there is a large potential error in extrapolating to long average recurrence interval (ARI) such as 100 years. The existing temporal rainfall pattern in MSMA 2 is not reliable and need to review using the additional data.