CHAPTER 6:
HYDROLOGICAL OBSERVATIONS: PRECIPITATION MEASUREMENT

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INTRODUCTION

Hydrological observations are generally a quantitative method to explain the process in the water cycle such as precipitation, runoff, infiltration, evaporation and other processes [1]. As the water cycle is closely related to human daily activities, whether intentional or not, human social and economic activities have been impacted by the hydrological cycle and vice versa. Long-term hydrological observations are particularly important for disaster management and mitigation involving floods and drought. The reliable and consistent hydrological observation records would enable quality forecasting technology and other statistical analysis to evaluate the risk and impact of the disaster and also to help in formulating mitigation measures.

PRECIPITATION

In the Earth's atmosphere and environment, precipitation is an important component of the water cycle and plays a prominent role associated with the atmospheric circulation that directly influences the Earth's weather and climate [2]. Accurate and reliable precipitation records are very crucial in water resources management, climate and weather variation and hydrological forecasting. The term precipitation denotes all types of water, such as rainfall, snowfall, hail, frost and dew, that enter the earth from the atmosphere [3]. However, only rainfall and snowfall contribute significant amounts of water for collection and supply. In Malaysia, precipitation is a

predominant type of rainfall and is used synonymously with precipitation. Precipitation magnitude displays strong spatial and temporal variability and has influenced numerous factors.

Point Precipitation

Rain gauges are the most common method for the direct assessment of point precipitation or precipitation at one location. The main purpose of a rain gauge is to measure the depth of rainfall as it accumulates over time. A rain gauge essentially consists of a cylindrical-vessel assembly kept in the open area to collect rain. Precipitations are expressed in terms of the depth at which water would stand on an area if all the rain was collected there [3]. Thus, a 1 cm depth of rainfall over a catchment area of 1 km^2 is equal to 10^4 m^3 volume of water. The collected rainfall by the rain gauge is controlled by its exposure conditions. Standard settings are followed to allow the rain gauge to accurately measure the rainfall that would reflect the rainfall in the area surrounding. Some important considerations for setting up a rain gauge are as follows:

1. Rain gauges should be installed in an open area away from any obstruction. No object should be nearer to the instrument than 30 m or twice the height of the obstruction.
2. The ground must be level and the gauge must be level with the ground.
3. The gauge must be set as near the ground as possible to reduce wind effects but it must be sufficiently high to prevent splashing, flooding, etc.
4. The instrument must be surrounded by an open fenced area of at least 5.5 m x 5.5 m.

Rain gauges can be specifically categorized as non-recording and recording gauges. In UMK, precipitation is normally determined using