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“Impact of Climate Change and Its Variability on the Rainfall Pattern in Sarawak River Basin”

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Abstract

Climate change due to global warming is expected to play a role in determining the availability of water in years to come. An understanding on the potential effects of climate change on the hydrology of a river basin is important in preparing adaptability measures that will produce benefits even if climate does not change. For the case of Sarawak River Basin, long term impacts of climate change on the local scale is still not clear. Thus, a detailed study is needed and this paper aims at presenting the findings of a preliminary study on the rainfall pattern for Sarawak River Basin done by the authors of this paper. The trends for temperature and evaporation rate for a station in the basin are also presented. Some adaptability measures in preparing for the potential effects of climate change for the basin will also be discussed.

Keywords: Climate change, rainfall pattern, Sarawak River Basin

1. Introduction

One of the most urgent issues in today's hydrological research is regarding the impacts of climate change which are directly or indirectly influencing many hydrological processes. However, for the case of Sarawak River Basin, the long term impacts of climate change on the local scale is still unclear due to the lack of comprehensive studies done. This paper aims on presenting the findings of a preliminary study on the probable climate change impact on the rainfall pattern for Sarawak River Basin by using statistical method such as time series and mean areal rainfall. The basic element for this study is rainfall since it is the main intake of the hydrological system of the basin and is responsible for the water balance variability and has deep implications on the whole water cycle. The trend for temperature and evaporation rate for the basin has also been discussed in this paper since changes in temperature and evaporation will have direct impact on the average rainfall rates. Adaptability measures that could be applied in preparation for the potential of climate change for

the basin will also be proposed and discussed in this paper.

2. Sarawak River Basin

The Sarawak River Basin as shown in Fig. 1 has a total area of approximately 1435 km² up to the barrage. It consists of 2 main tributaries, namely Sarawak River Kanan and Sarawak River Kiri which meet near Batu Kitang; about 34 km upstream of Kuching city. The basin is largely undeveloped with impervious layer less than 6% and has a high average annual rainfall of 4000 mm to 4500 mm. The basin is influence by tidal and prone to flooding. To protect Kuching city from flood, the Sarawak State Government established the Kuching barrage in 1998 aimed at controlling the river and tidal flows under the Sarawak Regulation Scheme [1]. Though flooding is a frequent occurrence in the basin with the most severe flood happened from 25th to 28th January 1963, major floods seems to be happening more frequently during the recent years with water risen up to between 1 m to 3 m for some low lying localities in the basin. Examples are the floods from