

## Long-term trends of climate variability in upper Dong Nai river basin in Vietnam

TRUONG, Nguyen cung que<sup>1\*</sup> ; KONDOH, Akihiko<sup>2</sup>

<sup>1</sup>Department of Earth Sciences, Graduate School of Science, Chiba University, <sup>2</sup>Center for Environmental Remote Sensing, Chiba University

According to a report of the Intergovernmental Panel on Climate Change (IPCC) and last studies, Vietnam is considered as one of the most countries affected by climate change. That are in the sea level rises (SLR) 1 m scenarios, about 10-12% of Vietnam's population are directly impacted and the country will lose up to 10% of GDP. With the combination of SLR and an increase in precipitation in the rainy season, there is a possibility of a serious impact on low-lying coastal area and leads to flooding of up to 40,000 km<sup>2</sup> of the coastal delta and 90% of the Mekong River delta. It is also expected that temperatures will rise more significantly in the plateau region. Dong Nai river basin is located in the Southern Vietnam along with the Mekong River, that have supplied the major water resources of southern. Dong Nai river originates from the plateau of the Southeastern, through the Tri An reservoir, a major power generating dam of southern Vietnam, in the lower area it mixed with the tributaries of the Mekong Delta downstream and after that flows to East sea.

In the state which continues of changes on water resources Mekong river due to climate change, controversy about the potential impact of sediment transport and river flows downstream due to the cascade hydroelectric power plant system or dam construction on the upper Mekong basin, because of Dong Nai river basin is a water resources that can controlled by Vietnam, it is considered that is necessary to analyses change in hydrological regime due to climate variability and adaptation to that changes. The purpose of this study is detecting long-term changes in the climate data and runoff due to climate change in the Dong Nai river basin.

As hydrological information of the target basin, the Dong Nai river basin, last 20 years (form 1992 to 2011) data which observed by National Center for Hydro-Meteorological Forecasting (NCHMF), Department of Natural Resources and Environment (DONRE) of each region, Tri An hydroelectric power plant management office were analyzed by Empirical Mode Decomposition (EMD) to detected a long-term change in rainfall, temperature, potential evapotranspiration and runoff at the basin outlet (inflow of Tri An reservoir). EMD has recently been pioneered by Huang et al. for adaptively representing nonstationary time-series data as sums of zero-mean amplitude modulation frequency modulation components. The components, called intrinsic mode functions (IMFs), allow the calculation of a meaningful multicomponent instantaneous frequency.

The results show that trend of rainfall and temperature slightly increase, but the trend of potential evapotranspiration and runoff decrease in the last two decades within the basin. In the comparison with the results of Mekong River Commission or World Bank research on Climate change in Vietnam, we similarly conclude that rainfall and temperature tend to increase. It is considered change in land cover and land use within the basin is one of the causes of the downward trend of runoff. This is planning on the next study.

Keywords: Dong Nai river basin, climate variability, empirical mode decomposition, EMD