

# Precipitable water vapor obtained by means of GPS at Khon Kaen, Thailand

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## 1. Introduction

We performed GPS measurements at 4 stations in Thailand which is in the Asia monsoon region during the period between 1998 and 2000 and investigated their precipitable water vapor (PWV) changes. In the present study, we processed new data at Khon Kaen in the northeastern Thailand to obtain the PWV and investigated the characteristics of its seasonal change and diurnal change.

## 2. Observation

GPS was set in the campus of Khon Kaen University, and the observation was started at August 2001. The data obtained between August 2001 and December 2002 were processed in the present study.

A Trimble 4000SSi receiver and a Trimble microcentered L1/L2 antenna are used in the observation. The antenna is fixed on the roof of a building and the data was sampled at every 30 minutes for 24 hours a day and they are downloaded to a harddisk of a computer once a day.

## 3. Data processing

We processed their data with GAMIT ver.10.07 by referring the 7 IGS stations data (Usuda, Wuhan, Lhasa, Guam, Singapore, Cocos Island, and Darwin) and obtained the zenith tropospheric delay (ZTD) at every one hour. 3 hourly PWV was obtained from the ZTD with air pressure and temperature data obtained from the Thai Meteorological Department.

## 4. Results

The PWV obtained changes widely in the range of 20mm to 60mm with the period of 1 or 2 weeks in the dry season, and we can see that the PWV increases before rainfall and decreases after the rainfall. On the other hand, it is almost constant to be about 60mm or 70mm in the wet season and changes only a little even when it rains. In the monsoon break of the middle of July 2002, the PWV obtained was decreased by about 10 mm.

In the beginning of the dry season, PWV decreases when the air pressure increases and temperature decreases. This change is related with the regional meteorological phenomena.

We obtained the average diurnal changes for pre-monsoon period and monsoon period and compared the two results. The difference of diurnal changes of the two periods was small and PWV had the minimum value at 4 - 7 o'clock in the morning and it had the maximum value in the evening or the midnight in the both periods.