

Hydrological Characteristics in the Lam Phra Phloeng River, Thailand

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This study aims to clarify the water balance of the tropical area. To accomplish this purpose, hydrological field observation, that is, water level of river, heat flux etc. is carried out to analyze the runoff characteristics in the Lam Phra Phloeng River, north-east Thailand.

The observation result at the hydro-meteorological stations in the Lam Phra Phloeng River experimental basin is following. The diurnal change of temperature is more than ten degrees in Celsius and humidity change in night time almost saturated, more than 90 %. The value of the net radiation rises more than 500 W/m² and heat flux on the ground surface also shows the considerable value. Runoff ratio is very small, that is, rainfall loss is very large.

Keywords : water balance, hydrological observation, Lam Phra Phloeng River, Thailand

1. Introduction

The system of the Lam Phra Phloeng River experimental basin (335 km²) is the following. The hydrological conditions such as wind, temperature, net radiation etc. are observed in this experimental basin. There are four hydrological stations in the experimental basin. The hydrological components of the stations are wind velocity, wind direction, temperature, humidity, net radiation, heat flux at the ground surface, river water level, and rainfall. The hydrological data are collected every 30 minutes and stored in the magnetic card in the card logger during one month. The electric power is supplied by the solar panel. Data of the analysis of the water balance were discharge, rainfall and temperature in the monthly base of 1998.

2. Result of observation

The diurnal change of the temperature is the following. On that day, the maximum temperature was 33.4 degree in Celsius at 14:00 and the minimum value was 16.8 degree Celsius at 7:00. The maximum net radiation was 583 (W/m²) and the

minimum was -45 (W/m²). The maximum surface flux was 104 (W/m²) and the minimum -24 (W/m²). The maximum amount of the evapotranspiration (latent heat flux) by the direct observation was 469 (W/m²) at 13:00, 2 February 1998. An example of the observation result of No.1 station in the dry season, February 1998 are following. The diurnal change of temperature is about 14 degrees in Celsius and humidity change is minimum in mid noon about 47 %, in night time almost saturated, more than 90 %. The value of the net radiation rises to 570 W/m² in maximum value and heat flux on the ground surface also shows the maximum value, 120 W/m². River water level was gradually decrease and the amounts was 2 cm a day. Furthermore the monthly change of rainfall, runoff and net radiation are analyzed. The monthly rainfall amount is the averaged by four stations. The maximum rainfall amount was 214 mm on May and the minimum was 8.5 mm on February. The runoff in the No.1 station has two peaks in May and in October (Fig. 1). The monthly runoff ratio is shown in the Fig. 2. The net radiation have large value from May to September,

that is, rainy season(Fig.3).

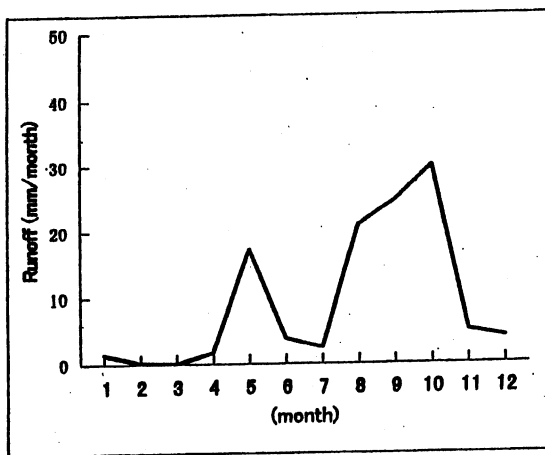


Fig. 1 Monthly runoff in 1998

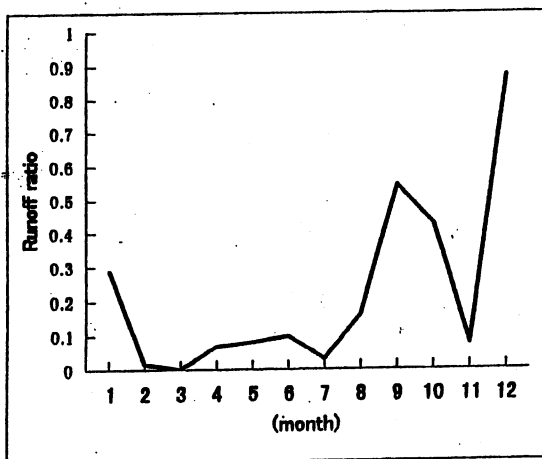


Fig. 2 Monthly runoff ratio in 1998

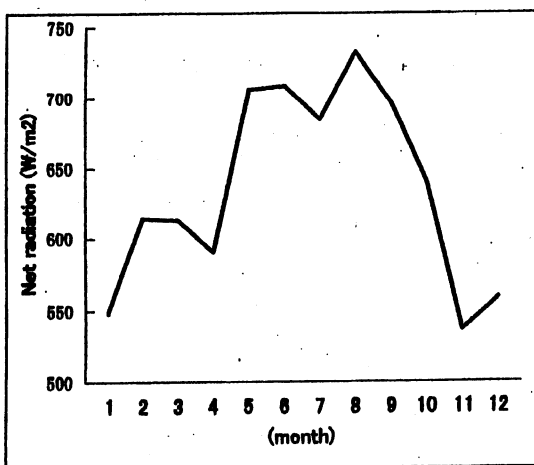


Fig. 3 Monthly net radiation in 1998

3. Discussions

The maximum net radiation in No.1 station on 2 February was 583 W/m^2 at 14:00 and 562 W/m^2 at 13:00. The value of the evapotranspiration by the direct observation was 469 W/m^2 . So almost part of the net radiation, more than 80 percent was evapotranspiration. This result shows that considerable evapotranspiration was occurred also in dry season of February though the soil moisture might be very small. The monthly runoff have two peak on May and October in 1998. The monthly rainfall amount of May was larger than that of October. But the runoff amount of May was lower than that of October. So the almost part of the rainfall on May became the lose, that is, stored in the ground, soil moisture etc. The water balance in a year, 1998 shows that annual rainfall amount was 706 mm and annual runoff was 111 mm. So annual rainfall lose was very large, 595 mm and annual runoff ratio was very small, 0.157.

4. Conclusion

As the hydrological observation of the Lam Para Phloeng river experimental basin, following matters are cleared. 1) Runoff ratio is very small, that is, rainfall loss is very large. 2) From the hydro-meteorological observation at No.1 station, the diurnal temperature change was larger than that of the rain season and humidity change are small in daily base. Net radiation is considerably large in day time.

5. References

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