

Yukon River hydrological and climatic changes, 1977–2006

SHAOQING GE, DAQING YANG & DOUGLAS L. KANE

Water and Environment Research Center, University of Alaska, Fairbanks, Alaska, USA
geshaoqing@gmail.com

Abstract This paper analyses long-term hydrology and climate data over the Yukon River basin. It uses regression analysis to define the relationship between the climate and discharge data over the basin. Discharge at the outlet of the basin shows low runoff in the cold season (November to April), with small variations. Flow is high (28 483–177 000 ft³/s; 807–5012 m³/s) with high fluctuations in the warm season (May to October). The discharge in May has a positive trend (177 000 ft³/s; 5012 m³/s). The mean annual flow is about 227 912 ft³/s (6454 m³/s), with high fluctuations; it has increased by 18 213 ft³/s (or 8%) during the study period. Basin air temperature from 1977 to 2006 increased by 3.9°F (2.2°C) in June and decreased by 10.5°F (5.8°C) in January. Basin precipitation has negative trend in June (0.6 inch; 15.2 mm) with a confidence over 93%. Regression analysis shows a strong and positive correlation between temperature and discharge in May, and a strong and negative correlation between May temperature and June discharge. Precipitation in August and September has strong and positive correlations with basin discharge in September and October.

Key words cold region hydrology; Arctic climate; Yukon River basin; correlation analysis