

## Historical Rainfall, Runoff and Flood of Wadi Siham Basin, Yemen

AL WARD, Majed ahmed<sup>2</sup> ; ISMAIL, Wan ruslan<sup>1\*</sup>

<sup>1</sup>Geography Department, Tamar University, Dhamar, Yemen, <sup>2</sup>Geography Section, School of Humanities, Universiti Sains Malaysia, 11800 Pulau Pinang

Wadi Siham Basin (WSB) is one of the most important agricultural areas, and one of the seven largest wadis in the western region of the Republic of Yemen. This study aims to evaluate the quantity and spatial and temporal variation of rainfall and runoff. The rainfall (1979-2008) as well as runoff and floods (1990-2009) data were collected and treated statistically in order to evaluate the rainfall and runoff trends. The areal catchment rainfall was estimated by using the Thiessen polygon method, while the recurrence interval and probability analysis were carried out using the Hazen method. The Mann-Kendall and Sen's slope analyses results showed that the Wallan and Al-Amir stations produced significant negative values (-4.72 and -6.11 mm/year respectively). However, the rainfall trend in Dhamar had a significant positive value of 50.20 mm/year. The average annual rainfall in WSB was 346.39 mm/year. The total amount of rainfall was 1711.26 Mm<sup>3</sup>. The mean annual water runoff was 82.92 Mm<sup>3</sup>. A total of 570 events of flood occurred with a total volume of 53.10 Mm<sup>3</sup>. The total water runoff was 4.85% of total rain precipitated on WSB indicating that the total amount of water loss was 95.15% varied between evapotranspiration and infiltration. In conclusion, the study results suggested the need for an urgent and sustainable water resource management in WSB.

Keywords: Rainfall, Runoff, Flood, Mann Kendal Test, Wadi Siham, Yemen