Storm-wise Analysis of Hydro-Sedimentary Response of Khamsan Watershed

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Abstract

Sediment yield of watersheds results from different erosional and hydrological processes which make it too complicated to be predicted. Awareness of runoff and sediment yield regimes is useful to better understand the erosional condition of watersheds for management. Therefore, determination of factors controlling hydro-sedimentary response of watersheds is very necessary. For this purpose, ground surveying and measurements of hydrograph and sediment graph were carried out in the representative basin of Khamsan in the uplands of Gavshan dam during 9 months. Finally, relationships between runoff and sediment yield were obtained, then corresponding runoff-sediment events were analyzed. Results showed that 5 events out of 6 occurring runoff events had eight-shaped hysteresis loop and only one event showed clock-wise hysteresis loop. Among them, the highest and lowest flood discharges were attributed to the events of 02.11.2010 and 05.01.2011 with 151488 M^3 and 11764.8 M^3 Run off, respectively. The study also showed that for this watershed no specific type of loop existed for a particular season. Accordingly, the seasonal patterns could not be attributed to a particular type of loop. Precipitation and runoff characteristics may have also played a role in addition to other factors. Results emphasize the importance of rainfall distribution and rising-falling limbs of hydrograph for the corresponding hysteresis loops in small watersheds.

Keywords: Hydro-sedimentary response, Rating loop, Khamsan watershed, Sediment graph.

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