

Rating curve estimation using remote sensing hydraulic data and isovel contours at Karun River

Hossein Farnoush¹ and Mahmoud Maghrebi²

¹Ferdowsi University of Mashhad Faculty of Engineering

²Ferdowsi University of Mashhad

January 19, 2022

Abstract

Determining discharge and stage-discharge curves in rivers or basins without Hydrometric gauges is critical challenge in hydrologic studies and river hydraulics. Researchers and designers have always been trying to access simpler and cheaper methods to estimate discharge and rating curves. This research aims to facilitate the determination of the discharge and stage-discharge relationship by applying remote sensing techniques as well as the concept of isovel contours. For this purpose, the geometry of the river cross-section is determined using remotely sensed data from the images of the Sentinel2 satellite, and then discharge passed through the cross-section is estimated by the single point velocity measurement method (SPM). The observed data were collected from the Mollasani station in Karun River, Iran, to confirm this method. The obtained discharges and stage-discharge relationship curves are used to evaluate the accuracy of the proposed methodology. Statistical analyses showed that the mean value of the percentage error(%E) and Mean Absolute Percentage Error (MAPE) calculated based on the difference between the estimated and observed discharges are limited to 6.3% and %8.36, respectively. Also, the stage-discharge curves in these studies were estimated with a maximum MAPE of 9.5%.

Hosted file

Manuscript.docx available at <https://authorea.com/users/456198/articles/553332-rating-curve-estimation-using-remote-sensing-hydraulic-data-and-isovel-contours-at-karun-river>

Hosted file

List of Figures.docx available at <https://authorea.com/users/456198/articles/553332-rating-curve-estimation-using-remote-sensing-hydraulic-data-and-isovel-contours-at-karun-river>

Hosted file

List of Tables.docx available at <https://authorea.com/users/456198/articles/553332-rating-curve-estimation-using-remote-sensing-hydraulic-data-and-isovel-contours-at-karun-river>