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Title:

Evaluation of effects of construction of the Karkheh Dam on the morphologic characteristics of its downstream

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Abstract

Determination of river boundaries is necessary for water resources management and finding suitable locations for farms, cities and industrial factories that locate in near rivers. For determination of river boundaries, studying and recognition of morphological characteristics and variations of slope, bed of river, longitude profile, cross sections and plan of river is necessary. Several factors increase variation of rivers for example construction of dams in Iran.

In this research, variation of morphological characteristics in downstream of the Karkheh Dam is studied (hydraulic, hydrology and morphological studies). The case study locates between Paypool hydrometric station and Hamideh hydrometric station. Karkheh Dam reduced peak flood hydrograph for floods that their return periods are less than ٥٠ years. Therefore these floods can not spillover to floodplain and area of floodplain reduces more than ٨٠٪ for these floods. Also suspended sediment discharge reduces more than ٩٠٪ for these floods (results of MIKE-١١ Software). Introduced cross sections to MIKE-١١ were prepared before and after construction of dam. By consideration of variations of bed river, it is observed that extreme erosion occurred in distance between Paypool and Abdolkhan while extreme sedimentation occurred in distance between Abdolkhan and Hamideh after construction of dam. But variations of bed river reduce recently because stability of river increases. Fluvial-١٢ software illustrated variations of shape of different cross sections of river. Variations of shape of cross sections of river are independent from variations of discharge in distance between Paypool and Abdolkhan while these variations are dependent to variations of discharge in distance between Abdolkhan and Hamideh. Floods can vary a small part of each cross section (especially in upstream of river). This subject shows relative stability of cross sections of river. Satellite images illustrate stability of plan of river. These images showed that many of the sections have been displaced in near Paypool hydrometric station while a small number of sections have been displaced in near Hamideh hydrometric station. But displacement of sections near to Hamideh hydrometric station is very high because fine particles (from sedimentation after construction of dam) cover bed and banks of this part of river. Rosgen classification method and satellite images illustrate instability of upstream of river (near to Paypool hydrometric station). These methods compared situation of rivers in ٢٠٠٤ and ٢٠١٤. Rosgen classification method illustrated that length of F class (an instable type of rivers) increased from ٢٠٠٤ to ٢٠١٤ in upstream of river. Also satellite images showed low sinuosity of bends in this part of river. Shulits equation illustrated instability of slope of river for this part too.

Key words: *Morphology, The Karkheh River, Hydrological studies, Hydraulic studies, Rosgen classification method, Shulits equation, Sinuosity coefficient*