

Comparison of Methods to Distinguish the Impact of Human Activities and Climate Variability on Runoff and Sediment Load of River

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**Abstract:** Runoff and sediment loads from river basin are largely affected by the interplay of climate variability and human activities within the basin. Distinguishing the impacts of climate variability and human activities would improve our knowledge of water resources, climate change and variability and its adaptation, and watershed or river basin management. The mainstream methods are discussed from different criteria of principle and process to compare their functions and shortcomings. We conclude that the different methods should be combined for better description of a river basin. A new and simple method to determine the impact of human activities within paired datasets under the same or similar weather conditions (SWC) is put forward to improve the precision of research because of a setting of same climatic backgrounds of 2 or more stages. These weather conditions cover one or more meteorological elements such as precipitation, temperature, or evaporation. If there are two or more periods with similar weather conditions but different runoff, the relative runoff and sediment load changes can be considered a consequence of human-induced land surface changes. The method could help us to know the net impacts of human activities, especially the intensive ones like engineer and soil and water conservation. The method is simple and easily applicable to selected periods in most areas and could be extended when more detailed data are available.

**Key words:** method; assessment of environment impact; human activity; climate variability; similar weather condition (SWC); hydrologic process