

Study on runoff and sediment evolution and driving factors of Dagu River

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Objectives

- ◆ Study the variation trend of runoff and sediment discharge of Dagu River, identify mutation years.
- ◆ Study the **periodic changes** in runoff and sediment transport, extract the **main period of changes**, and reveal the complex structure of multi time scale changes.
- ◆ Quantitatively separate the contribution rate of **climate change** and **human activities** to runoff and sediment change.
- ◆ Providing reference for environmental protection and ecological civilization construction in river basin.

Methods

Using long series data during 1956-2016, the variation of Dagu River runoff and sediment in different periods was analyzed by Mann-Kendall test, Moving T-test, cumulative anomaly curve, Morlet continuous complex wavelet analysis.

Based on the result of evolutionary characteristics, the contribution rate of climate change and human activities to the change of runoff and sediment transport was calculated, by Double Cumulative Curve Method and Cumulative Slope Change Rate Method respectively.

Results

- ◆ There was a significant decreasing trend for both runoff and sediment transport, but the decreasing trend of precipitation was not significant.
- ◆ There was a mutation for runoff in 1976, however sediment transport were mutation in 1965 and 1979.
- ◆ The runoff had three changing circles: 8a, 12a and 21a, with the first main cycle of 21a. The periodic variation of sediment transport had three obvious time scales: 5-8a, 9-17a and 18-30a, with the first main cycle of 12a.

Conclusions

Human activities were the main reason for the reduction of both runoff and sediment transport. The contribution rate of human activities to the change of runoff was 76.8%-97.4%, and the contribution rate to the change of sediment transport was 76.2%-98.4%.

