



Hydrological change in the Mekong river - flood trends and variability

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Daily average discharge is analyzed in the Mekong river in South East Asia, focusing on tendencies and variability of floods in the 20th century, in an effort to separate unfounded perceptions and empirical evidence. After using trend detection methods usually suggested in literature, other less common approaches to trend analysis were used, namely non-stationary general extreme value (GEV) function and the wavelet power spectrum.

Data from four gaging stations downstream of Vientiane, Laos, were used, covering two distinct hydrological regions within the basin. These time series span for over 80 years and are the longest daily discharge time series available in the region.

Results from commonly used techniques like Mann-Kendal test and a resampling of linear regression were contradictory and did not show a clear signal. The introduction of the non-stationary GEV allowed to isolate variability from the average trend and to have a more complete view of the changes. Variability could also be translated into significant amplitude changes in a wavelet power spectrum, which confirmed the results of the non-stationary GEV. Overall, results showed increasing likelihood of extreme floods and variability with time, although the mean flood tends to decrease in magnitude.

We conclude that the initial absence of clear signals in the hydrological time series was a methodological misconception due to oversimplistic models. More adaptive methods, as well as increasingly non-linear hypothesis yield more coherent results.