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Impact of *Chelicorophium curvispinum* on the concentration-discharge response of suspended sediment in the Rhine River

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In an ongoing study to the decline in suspended sediment concentrations and loads in the Rhine river since the mid-1950s, the temporal changes in the power-law sediment rating curve parameters were examined. This revealed that the rating exponent of the rating curve increased substantially between the early and late 1980s. Until the early 1980s, the ratings curves were relatively flat with values of the rating exponent b varying around 0.2. In the mid-1980s, the exponent suddenly increased to a value between 0.4 and 0.6 and since then has remained within this range. This change in the rating exponent was mainly caused by a decrease in suspended sediment concentrations during low discharges. During high discharges, the suspended sediment concentration initially increased during the late 1980s, but this increase was nullified soon afterwards due to the declining trend in suspended sediment concentration.

The sudden increase of the rating exponent coincided with the period that the Ponto-Caspian *Chelicorophium curvispinum* (Caspian mud shrimp) invaded the Rhine river basin. This suggests that this suspension-feeder species bears the prime responsibility for this increase, although this hypothesis requires further independent evidence. The sudden increase in the rating exponent does however not manifest itself in the long-term gradual trend of declining suspended sediment concentrations and vice versa. Apparently, the sequestration of sediment by *Chelicorophium curvispinum* is only temporary: the suspended sediment sequestered during periods of relatively low discharges is likely remobilised again during periods of high discharge. This implies that the invasion of *Chelicorophium curvispinum* has not played a significant role in the decline of suspended sediment concentrations. The precise reasons for the gradual long-term decline in suspended sediment concentration remain yet unknown.