Examination of the declining trend in suspended sediment loads in the Rhine River in the period 1952-2016

Introduction

Sediment loads have decreased drastically in rivers worldwide during the past decades. The Rhine River is no exception and also conforms this global trend. To quantify this declining trend of suspended sediment loads in the Rhine River, we reexamined the annual suspended loads at the Lobith monitoring station near the Dutch-German border for the period since the start of the start of regular monitoring of suspended sediment concentrations (SSC) in 1952 until present (2016).

Approach

1) Power-law sediment rating curves $(SSC = a Q^b)$ were fitted for approximately 5 yearperiods

2) Annual suspended sediment loads and discharge-weighted average SSC at the Lobith monitoring station were estimated using:

- daily discharge data (meausred)
- daily SSC
- pre 1989: 5-year sediment rating curve based on bi-weekly SSC measurements
- post-1989: daily measurements

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1995-1999 -2000-2005 -2006-2

1969	19/0-19/4
1989	
2010	



Conclusions

• The annual suspended sediment load has decreased by 70% since 1952. • Since about 2005, the sediment load seems to have stabilised.

• The discharge-weighted average SSC show a similar, but more consistently declining trend between 1960 and 2005.

• The 5-year rating curves reveal that the decline in average SSC becomes particularly manifest at low discharges.

• The rating curves can roughly be classified into three groups. Major shifts in the sediment rating curves occurred around 1980 and around 2000. • The identification of the precise causes will be subject of future study.