



How reliable are catchment area – sediment yield relationships?

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Several studies have reported on the relation between area-specific sediment yield (SSY, ton/km²/yr) and catchment area (A, km²) for different regions. Generally, a negative relationship is expected due to a decrease in topsoil erosion rates on more gentle slopes and an increase in sediment deposition rates with an increase in catchment size. Nevertheless, several other factors (e.g. temporal variations in SSY, measuring technique, dominant sediment source, etc.) also play an important role, leading to a lot of scatter or even a different type of relationship. Therefore the reliability and cause of A-SSY relationships is often disputable.

Based on a large database of SSY measurements in Europe (covering around 24 000 years of measurements at around 1 800 different locations), we explore the effects of the measuring period and measuring technique on the stability and quality of A-SSY-relationships for different regions. By splitting up the dataset in different groups, according to the duration of the measuring period and by applying weighed regression techniques, we evaluate the effects of temporal variations of SSY on these relationships. We further compare the differences in relationships when SSY are derived from bathymetric surveys in reservoirs or from measurements at gauging stations. Finally, we explore the stability of the different A-SSY relationships by using Monte Carlo simulation techniques.