

Fitting sediment rating curves using regression analysis: a case study of Russian Arctic rivers

NIKITA I. TANANAEV

Igarka Geocryology Lab, Bldg. 8A, 1st District, Igarka, Krasnoyarsk Krai, 663200, Russia
nikita.tananaev@gmail.com

Abstract Published suspended sediment data for Arctic rivers is scarce. Suspended sediment rating curves for three medium to large rivers of the Russian Arctic were obtained using various curve-fitting techniques. Due to the biased sampling strategy, the raw datasets do not exhibit log-normal distribution, which restricts the applicability of a log-transformed linear fit. Non-linear (power) model coefficients were estimated using the Levenberg-Marquardt, Nelder-Mead and Hooke-Jeeves algorithms, all of which generally showed close agreement. A non-linear power model employing the Levenberg-Marquardt parameter evaluation algorithm was identified as an optimal statistical solution of the problem. Long-term annual suspended sediment loads estimated using the non-linear power model are, in general, consistent with previously published results.

Key words suspended sediment load; suspended sediment rating curves; Russian Arctic; regression analysis