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Sediment rating curve & Co. – a contest of prediction methods

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In spite of the recent technological progress in sediment monitoring, often the calculation of sediment yield (SSY) still relies on intermittent measurements because of the use of historic records, instrument-failure in continuous recording or financial constraints. Therefore, available measurements are usually inter- and even extrapolated using the sediment rating curve approach, which uses continuously available discharge data to predict sediment concentrations. Extending this idea by further aspects like the inclusion of other predictors (e.g. rainfall, discharge-characteristics, etc.), or the consideration of prediction uncertainty led to a variety of new methods. Now, with approaches such as Fuzzy Logic, Artificial Neural Networks, Tree-based regression, GLMs, etc., the user is left to decide which method to apply. Trying multiple approaches is usually not an option, as considerable effort and expertise may be needed for their application. To establish a helpful guideline in selecting the most appropriate method for SSY-computation, we initiated a study to compare and rank available methods. Depending on problem attributes like hydrological and sediment regime, number of samples, sampling scheme, and availability of ancillary predictors, the performance of different methods is compared. Our expertise allowed us to "register" Random Forests, Quantile Regression Forests and GLMs for the contest. To include many different methods and ensure their sophisticated use we invite scientists that are willing to benchmark their favourite method(s) with us. The more diverse the participating methods are, the more exciting the contest will be.