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Comparative overview of reservoir siltation assessment techniques depending on the type of sediment

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Over many decades it has become evident, that sediment accumulation threatens the fundamental operation of reservoirs by reducing the storage volume, hindering technical functions and deteriorating water quality over time. Most scientists, operators and authorities are aware of this, often “silent” but enduring process. However, not often mitigation measures are applied with foresight and in an appropriate manner according to this global problem. One fundamental reason for the often hesitant implementation of measures is the lack of precise and applicable assessment techniques. The type of reservoir, available historic data and especially the composition of the sediment may allow only for one available method to be applied successfully. In this study we present a workflow to select the best available method to detect the sediment thickness correctly. We compare topographic differencing, dual-frequency echo sounding, sub-bottom echo sounding, free-fall penetrometer measurements and sediment coring. Next to the general applicability, the precision (vertical resolution) and the time requirement for the measurement are relevant factors. A special point of discussion is the presence of free gas inside the sediment, often creating measurement errors, leading to underestimation of the sediment thickness.