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Intrusions of sediment laden fluids into density stratified water columns can be an unrecognized source of mixing in many lakes.

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When a sediment laden river flows into a stratified water body, the water mass can either intrude as an overflow, interflow, or underflow depending upon the density contrast between the river and the lake. If the river is sufficiently warm or fresh to compensate for the additional mass of sediment, an overflow results, below which convective sedimentation occurs. If the sediment load is sufficiently high, then an underflow initially occurs, from which the warm/fresh interstitial material can subsequently loft as sedimentation reduces the initial density. Such convection can even potentially overturn the water column stratification if there is a very fresh, but very high sediment load turbidity current. For intermediate cases, an interflow can occur. Here it is possible for both lofting and sediment driven convection to occur above and below the pycnocline. All these different regimes can be described in terms of two dimensionless parameters: R_S and R_A, which are ratios that compare the density contrast due to sediment between the river and the upper layer with the density contrast between the upper and lower layers and the density contrast between the river and upper layer, respectively. We used laboratory experiments to describe the vigour of convection in terms of these dimensionless parameters, which then allows the behaviour in various rivers inflows into lakes to be predicted. We also apply our observations to predict how a turbidity current could lead to lofting and possible overturn of the stratification of meromictic Lake Kivu.