Resolution limit due to bioturbation

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Bioturbation is an important process in the early diagenesis of soft marine sediments. Benthic infaunal activity, such as feeding, burrowing or ploughing redistributes particles within the surface sediment. The stratification of the sediment layers is (partly) destroyed and sediment particles with different associated climate signals are mixed into a single sediment depth. Bioturbation can be modelled under certain assumptions as a diffusive process with (depth dependent) biodiffusion coefficient D_b and mixed layer length scale L. Bioturbation acts as filter, which distorts and shifts the climate signal before it is stored in the sedimentary record. Moreover bioturbation tends to suppress high frequency signals and thus limits the resolution of the sedimentary record. If bioturbation is modelled as a selective process, which discriminates between different fractions of the sediment, then major biases between different proxies can be introduced.