High fluctations of suspended load in a tidal influenced river mouth, west coast of India

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Suspended load of water bodies play a major role in studies related to pollution levels, turbidity, source and sink of sediments, sediment transport, etc. Proper sampling method brings out acceptable interpretations. Many times, one time observation of suspended sediment load is considered as representative of that aqueous ecosystem. However, one time observation of suspended sediment load may be less objectionable in substantiating the interpretation of the observation when aqueous body is a land locked lake or undisturbed fresh water river system. Therefore, the present study was carried out to check the validity of one time sampling. The study involved, every 2 hours observation of suspended sediment load at surface, mid depth and at near bottom of a tidally influenced river mouth (River Dahej), at west coast of India, for 2 days. The obtained data reveal high fluctuations in the volume of suspended sediment matter. Various parameters such as flood tide, ebb tide, slack period, spring tide, neap tide, fresh water-sea water mixing, water currents, etc., must be controlling the suspended sediment matter concentration in an environment which is influenced both by marine and riverine ecosystem. This study therefore, reveals the necessity of an acceptable sampling protocol considering all the controlling parameters so that interpretations of the observations are truly representative of the conditions of the involved aqueous ecosystem.

Effect of lake sediment application on soil structure assessed by means of X-ray computed microtomography

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It is known that lake sediments applied to agricultural soils may improve soil fertility on dry sandy soils by increasing soil carbon storage and water holding capacity. In contrast, the effect of lake sediments on soil structure has not been well documented yet even though some of the documented effects must be linked to soil morphology. X-ray computed microtomography enables to characterize objects down to 50 μm or less and has recently successfully been applied to soil. The aim of this study was therefore to analyze, by means of X-ray computed microtomography, the structure of soil amended with lake sediments compared to a control.

At the long-term experimental site Lietzen in Brandenburg, lake sediments were applied to the soil after harvest at rates of 15 and 70 t/ha. At two locations within the 70 ha sized field, two undisturbed soil samples each (diameter 3.1 cm, height 4 cm) were taken from 0-4 cm soil depth. They were analysed with a 320 kV micro focus X-ray tube (spatial resolution 1/1000 of maximum sample diameter). The morphometric analysis included the determination of the overall pore volume and the local variance in the samples.

The morphological analysis showed that differences between amended and control soil were minor. In contrast, soil texture which differed strongly between the two sampling sites seemed to profoundly affect soil microstructure (pore volume, soil heterogeneity). It is assumed that the observed differences in soil structure are ultimately linked to soil texture-induced differences in soil biological activity.

The results show that more research is needed to entangle the effects of soil texture vs. management effects on soil microstructure and to identify mechanistical links between soil structure and soil biota under field conditions.