SUSPENDED SEDIMENT SOURCES ALONG THE MAIN INLET STREAM OF A SOUTH KOREAN DRINKING WATER RESERVOIR

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Due to the rapid agricultural expansion and intensification during the last decades in the Haean basin, a mountainous catchment in South Korea, large areas of hill slope forests were transformed to paddies and vegetable fields. The intensive agriculture and easily erodible soils are a major reason for increased soil erosion resulting in high suspended sediment loads in the river systems and finally the drinking water reservoirs. Among others the hydroelectric reservoir Lake Soyang which also provides water supply for large population centres downstream, is concerned. Landscape managers need to know the land use specific origin of these sediments before they can create landscape amelioration schemes.
We applied a compound-specific stable isotope (CSSI) approach using the isotopic (d13C) signature of plant-wax derived long-chain fatty acids to apportion the sources of the suspended sediments in the Lake Soyang catchment. Source soils under different vegetation types, (forest, vegetables, rice paddies and maize) and suspended sediment samples for three different time events from five sampling locations along the river, starting at the forested headwater catchment and ending at the inlet of Lake Soyang were analysed. A last sampling spot was a sediment core from the Soyang dam. Fatty acid isotope signals were then used as input for mixing calculations and the mixing model software IsoSource and MixSIAR to identify the contribution of the different source soils to the suspended sediments. The fatty acid isotopes significantly differ between different land use types, highlighting a predominant arable sediment contribution (72-77%) already in the upstream catchment. Downstream a shift to less negative d13C values indicates an increasing contribution of C4 plants like maize. The data we will present shows strong indication of an increased vulnerability of the agricultural soils especially where maize is grown.