



Changes in sediment deposition in the catchment of a man-made reservoir in the Pyrenean region (France) over the last 80 years. Comparison between local sedimentation rates and simple distributed erosion model

Th. Condom (1), **S. Schmidt** (2), V. Lignier (3)

(1) EA 2957 - Institut EGID, Université Bordeaux 3, 33607 Pessac Cedex, France, (2) UMR 5805 EPOC, Université bordeaux 1 - CNRS, 33405 Talence Cedex, France, (3) EDYTEM, FRE 2641 CNRS - Université de Savoie, France

The purpose of this study is to understand hydrological functioning and sedimentary dynamics of a dam-reservoir. This reservoir used for water supply is situated in a small watershed (2.8 km³) in the middle Pyrenean mountains (maximum elevation: 573 m asl). Anthropic activities are restricted to pasture and forestry plantation in order to limit water pollution. Two hydraulic amenagements exist in the reservoir: - a present day dam constructed in 1996 with 850 000 m³ water capacity; secondly, in central part of the lake, we found an older dam constructed in 1929 with 310.000 m³ capacity. In order to achieve sedimentary dynamics in the lake, a sediment core of about 31 cm was sampled in August 2006 closed to the former dam. At the lab, this core was opened longitudinally for radiographical study, and sampled for granulometry and radionuclides analyses. X-ray image and porosity highlight an erosion contact at about 19 cm in depth. Deeper in this core, profile of ²¹⁰Pb allows to calculate a sedimentation rate of almost 0.4 cm per year. According to this result and the position of the Chernobyl ¹³⁷Cs peak, the erosion contact is ascribed to the opening of the old dam in 1996. After 1996, sedimentation rate decreases significantly (0.2 cm per year) part of the sedimentation occurring now further closed to the new dam. Sedimentation processes are therefore linked with the new dam construction. A distributed model based on Revised Universal Soil Loss Equation (RUSLE) was used to calculate erosion rates at watershed scale. Results obtained with this model are in good agreement with local

sedimentation rates issued from radiometric measurements on lake sediments. Finally, this study based on the downscaling-upscaling approaches allows an integrated vision of erosion and sedimentation processes in the watershed leading to an operational lake management.