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# Geomorphological applications of a $^{14}$C database of colluvial and fluvial environments in Germany.

**T. Hoffmann** (1)

(1) Department of Geography, University of Bonn (thomas.hoffmann@uni-bonn.de)

There are indications of an increasing tendency of extrem floods and human impact on fluvial systems. Therefore, it is necessary to evaluate the interdependent influences of climate versus land-use changes in the past. The difficulty is to differentiate between natural changes and human induced modifications. This problem is the basis for the global initiative “Land Use and Climate Impacts on Fluvial Systems during the period of agriculture” (PAGES-LUCIFS). The RheinLUCIFS projects aims to reconstruct the land use history and fluvial activity in the Rhine catchment (185 000 km$^2$) since the Neolithic, approx. 7500 yrs. ago.

Furthermore, little is known about the residence time of sediment in fluvial systems, which in turn influences their response to land use and climate impacts. Large catchments with long residence times are believed to have larger buffer capacities and are therefore more stable than small catchments.

There is large number (approx. 750) of published $^{14}$C dates taken from colluvial and fluvial environments in Germany. Usually, $^{14}$C dates are obtained from small areas and are therefore used to establish the timing of different geomorphological processes at small scales. However, a summary of all dates and a large scale analysis is still missing. It is state that a joined analysis of almost all publishd dates my give new insights to sediment residence times in geomorphological systems and a better understanding of the timing of sediment fluxes throught the Holocene. Therefore a database of (until know) 350 published $^{14}$C dates was build up. The $^{14}$C dates are classified in terms of geomorphic activity (e.g. colluviation, flood plain deposition), geomorphic stability (e.g. soil formation, peat development) and by sedimentation units (e.g. colluvial, channel fills, palaeochannel fills). Furthermore, information about their location within the catchment and their river network is stored in the database.

Based on the classified database, probability distributions of phases of increased geomorphic activity and stability were reconstructed. The distributions result from the summed probalilty distributions of each date within a certain class. First results of activity and stability of colluvial and fluvial systems will be compared with the history of land use change in certain areas in Germany.

It is tested, wether such a $^{14}C$ database, which includes a variety of geomorpholocial environments, may give indications of residence times in fluvial systems. Therefore probability distributions of $^{14}C$ dates, which are group based on their corresponding catchment area, are compared.