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Morpho-bathymetrical conditions and the silting rate in Stanca-Costesti reservoir (Romania)

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Stanca-Costesti Reservoir holds the largest amount of water among reservoirs located in Romania and has multiple purposes, such as flood mitigation, hydropower production, irrigation etc. Our bathymetric survey was conducted along longitudinal, as well as transverse alignments, so as to cover the entire lacustrine surface by using an echo sounder. Data from three different surveys were employed, i.e. topographical (dating back to 1977, before the onset of flooding) and bathymetrical (1986 and 2000) surveys. The drainage basin of this reservoir extends accross three countries, Romania, Ukraine and Republic of Moldova, and whereas the mountain sector of the basin is mostly covered by forest, the lowland (the Moldavian Plateau) is used for agriculture, i.e. cereal crops. Thus, deforestation and inappropriate tillage techniques employed within this basin result in increased soil erosion. Most of the sediment load is carried during flood events, which have grown increasingly common, particularly in summer. The terraces formed along the downstream sector of the reservoir are not covered by alluvium, whereas the corresponding terraces from its upper sector have been covered by submerged glacises. Moreover, in the area of Ciugur river mouth we observed a submerged valley, as well as several submerged natural levees. The deepest area of the reservoir (29.2 m) is located adjacent to the dam and is thought to be the outcome of a circular current generated by the lake bottom morphology. The silting degree is rather high, ranging up to an index value of 7.3% over 33 years.