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Lower Danube Floodplain: Middle to Late Holocene sedimentation rates and organic matter sink (processes and patterns)

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The stratigraphy of the lower reaches and floodplains store both mineral sediments and organic matter which are very important for understanding the environmental evolution and organic carbon storage over time. By deciphering the sedimentation patterns of floodplains is important for understanding how they adapt to Holocene sea level and climate changes.

The present study is based on 10 cores from the Lower Danube floodplain between Braila and Tulcea, 50 14C ages and over 1000 samples which were sedimentologically and geochemically analyzed. These data allowed us to reconstruct sedimentation and environmental evolution patterns of the floodplain during the Middle and Late Holocene. Two major phases have been desciphered: **I)** between 8000 and 5500 years BP - a floodplain with a dynamic (rapid-changing) landscape characterized by interchangeable wet and dry areas), developed in a period with a decelerated sea level rise. In that time we find a decrease in the sedimentation rate (from 6.7 to 1.2 mm / year) and the grain mean-size (from ~ 4.75phi to ~ 6.5phi) and an increase of the organic matter content by about four times (from 2.5 to 10%) and **II)** between 5500 BP and the middle of the 20th century - a relatively-stable and wet floodplain (with large lakes and wetlands) which was partially silted by small channels). This latter phase was developed in a time with a quasi-stable sea level and it can be subdivided into two sub-phases: IIa) (5,500 - 2,200 BP) and IIb (2,200 - XX century). In the first, the sedimentation rate decreases slightly (up to 0.7 mm / year) while the organic matter content becomes almost double (~ 19%, 2200 years ago) and in the second, once with the rise of the Roman Empire, the sediments become finer with a much lower content of organic matter (~ 12%) and the sedimentation rate become doubles (~1.7 mm / year in the last millennium), all due to increased anthropogenic influence in the Danube river basin.