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Sedimentation processes and depocentres of the Danube – Black Sea system

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In this paper, the sedimentation processes and depocentres of a large river-sea system, namely the Danube River – Black Sea system, are discussed.
During the Quaternary the Danube River brought into the Black Sea significant volumes of sediment that were accumulated in depocentres the positions of which were dependent on the Black Sea water level. These depocentres migrated from their highstand positions represented by the present-day location of the Danube delta to the lowstand positions beyond the shelf-break at the Danube deep-sea fan complex. The volume and the rate of sediment accumulation in the highstand depocentre, as well as in the lowstand depocentre are evaluated.
While the volume of sediment deposited in the present-day Danube delta, including all of its morphogenetic and depositional units (fluvial and marine delta plains, delta front and prodelta) is only about 1,200 km3, the deep-sea fan complex stores >40,000 km3 of sediments with accumulation rates that range between 68 x 106 and 302 x 106 t/yr. The Holocene progradational littoral sandy sheet comprises about 22 km3 of sediments. The average annual sediment discharge of the River Danube during the Holocene is estimated to be around 80 x 106 m3/yr. This figure is consistent with the Danube sediment discharge measured before the Iron Gate barrage was completed (about 70 to 80 x 106 m3/yr). Although these estimates are only rough approximations, they provide a basis upon which the relative importance of sedimentation processes at the depocentres of a large river-sea system can be evaluated.
The paper represents a contribution to the ESF “Source-sink” project that had the Danube River – Black Sea system as the main study objective.