



Evolution of the Danube Deep-Sea Fan since the Last Glacial Maximum: insights into water level fluctuations in the Black Sea

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The Danube deep-sea fan is one of the most extensive deep-sea sedimentary systems in Europe. It lies in the base of slope of the north-western margin of the Black Sea, in front of Viteaz Canyon. Since the work of Popescu (2002) the detailed morphology and architecture of the fan is well known. During lowstand periods, the fan was fed by the Viteaz Canyon, which was directly connected to the Danube River. The fan has developed an impressive channel-levees network which is characterized by seven major channel avulsions (Popescu, 2002, Lericolais et al., 2013).

Despite the numerous sedimentary cores retrieved during the Blason (1998, 2002) and Assemblage (2004) oceanographic cruises, the details of the factors controlling the turbiditic activity of the Danube deep-sea fan still remained largely unknown. The purpose of our study is to improve the chronology of the Danube deep-sea fan and to tie the expected results to the recent findings obtained by Soulet et al. (2011) regarding the chronostratigraphy and environmental changes in the Black Sea since the Last Glacial Maximum (~26-19 kyr before present).

Seven küllenberg cores, retrieved from along the Viteaz Canyon and the deep depositional system, were analysed through detailed visual description, X-ray radiographs, spectroradiometry and X-Ray Fluorescence (XRF) scanner analysis. These analyses allow core-to-core correlation and the recognition of the well-known sedimentary units of Degens and Ross (1972; lacustrine and marine units) and Major et al. (2002; Red Layers), while using the revisited chronology of Soulet et al. (2011).

Sediment accumulation rates and turbidite frequency were then determined, revealing a shift in the sedimentation activity from the southern channel-levee system (Unit 3; Lericolais et al., 2013) to the northern channel-levee system (Unit 6; Lericolais et al., 2013) after the deposition of the so-called Red Layers 15,700 +/-300 yr ago and before the onset of the Bölling-Alleröd (14,700 yr cal BP). The feeding of the northern channel-levee system continued until the marine invasion ca 9,000 yr ago, while no turbidite activity in the Danube deep-sea fan and the Viteaz canyon is observed thereafter. These results are of primary importance to understand sediment transfer from source (Danube River) to sink (Danube deep-sea fan) in Central Europe since the last glacial period, and we will discuss our results in the light of recent reconstructions of past terrestrial environmental (Soulet et al., 2013) and sea-level changes in the Black Sea region (Lericolais et al., 2009).