Dating Submerged Shorelines in the Black Sea using Optically Stimulated Luminescence Dating

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Optically Stimulated Luminescence dating is dating method that relies on light sensitive quartz. The method measures the last time a sample of quartz was exposed to light. This method has never been used to date the submergence of a shoreline. On an expedition on the R/V Akademik, a Bulgarian research vessel, we had the opportunity to test Optically Stimulated Luminescence dating on the submerged shorelines of the Black Sea off the coast of Bulgaria. During the expedition we mapped and cored the submerged shoreline, taking samples for dating. Only the core taken with a Vibratory, core 27, managed to penetrate into the hardened shelly gravel of the submerged shoreline. From core 27 we collected three samples for Optically Stimulated Luminescence Dating, and articulated Dreissena shells from directly above the gravel – marine mud drape transition for radiocarbon dating. The Dreissena shells represent the first marine colonizers of the seabed once the shoreline was submerged. If the radiocarbon date is slightly younger than the Optically Stimulate Luminescence date then the Optically Stimulated Luminescence date is a viable date. If viable, Optically Stimulated Luminescence would allow the submergence of shorelines to be dated independently. The hope is that, if viable, the Optically Stimulated Luminescence dates obtained from the shoreline of the Black Sea will support or refute the flood hypothesis for the Black Sea, proposed by Ryan et al. (Ryan, W.B.F. et al., 1997) (Ryan, W.B.F. et al., 2003).

Mapping, Sampling, and Dating Submerged Black Sea Shorelines

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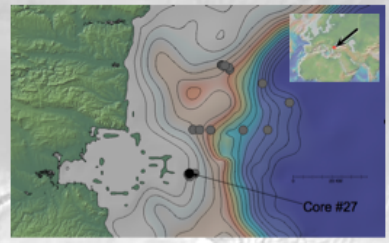
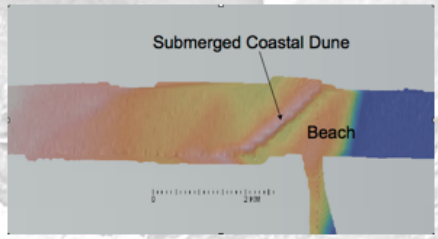
R/V Akademik



The 21 cores collected on the 2009 R/V Akademik expedition.



Map rendered from side-looking sonar data (white < 90m, blue > 95m).

Optically Stimulated Luminescence (OSL) dating samples being taken.