

Color Tells a Story: Evidence of Megafloods into the Black Sea when the Alpine/Eurasian Ice Sheets Collapsed

Elizabeth Matamoros¹, Daniel Berman², Anastasia Yanchilina³, William Ryan³, Timothy Kenna³

¹ Department of Earth and Planetary Sciences and Department of Environmental Science and Public Policy, Harvard University, Cambridge, Massachusetts ² Department of Chemistry and Chemical Biology, Cornell University, Ithaca, New York ³ Lamont-Doherty Earth Observatory of Columbia University, Palisades, New York

Core KN134-GC01 was extracted from the floor of the Black Sea. Discrete intervals of the core can be classified by their color. Dark gray belongs to the late glacial stage of the Pleistocene, red to the interval of rapid melting of the Eurasian and Alpine Ice Sheets, jet black to the Older Dryas, light gray to the Bolling/Allerod warm interstadials, and finely laminated olive green to dark green to the Holocene after the entry of salt water from the Mediterranean. X-Ray Fluorescence scanning revealed the elemental composition and allowed for correlation between color, bulk density, carbonate and lithology. Titanium identifies the detrital components that are abundant in red clays and immediately below the transition from fresh to marine. Bromide and Molybdenum identified the salt water green sediments. Calcium is high in the light gray layers and Manganese is more abundant in the dark gray glacial sediments. Many layers appear to have been deposited in pulses. Such layers begin with a thin sand/silt base and fine upwards into homogeneous clay. The base has the highest bulk density. CaCO₃ is abundant only in the light gray clay with values exceeding 60%, the dark gray averages 12%, the red clays 8%, and the green <1%. There are nine discrete pulses of the red, each forming a layer of about 10cm in thickness. From the examination of other Black Sea cores, the red clay is found in an area of approximately 60,000km². These pulses are interpreted as deposits from Megafloods. The detrital layers at the transition of the Mediterranean flooding into the Black Sea can be interpreted as earthquakes triggered by the rapid 75m change in water level.