2008 Joint Meeting of The Geological Society of America, Soil Science Society of America, American Society of Agronomy, Crop Science Society of America, Gulf Coast Association of Geological Societies with the Gulf Coast Section of SEPM

Paper No. 151-18

Presentation Time: 8:00 AM-4:45 PM

New Dynamic Classification of Lake Systems and Their Geological Records

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I propose a classification of lakes and their records based on three variables: **MLD**, maximum lake depth from floor to outlet; **PMD**, potential mean depth of the lake relative to MLD unconstrained by the outlet or lake floor; and **AWB**, amplitude of water balance variability deviating from PMD. If AWB = 0, we have Carroll & Bohacs (1) lake types: "overfilled", with PMD > MLD; "balanced fill", with PMD = MLD; and "underfilled", with PMD < MLD. However, AWB ≠ 0 and fluctuates in time in frequency and amplitude, leading to a huge range of lake behavior and sediment sequence types. Consider an AWB in the form of the precession parameter. If PMD > MLD and negative AWB excursions < MLD, the lake will be deep most of the time with deviations consisting of low stands at times of maximum precessional variability (mpv) [e.g., Lake Malawi cores (2)]. If PMD is close to but not below the lake floor, and positive AWB excursions > MLD, the lake will be mostly shallow punctuated by high-stands at mpv with flushing preventing extensive evaporites [e.g., Newark basin cores (3)]. But if PMD is close to or below the base of MLD, and AWB is less than MLD, the lake and its record may be dominated by short periods of high-stands at mpv, and long periods of evaporite production [e.g., Wilkins Peak Mb., Green River Formation cores (4)]. These variables express volumes in phase space into which lakes and their records occur, and have the advantage of being translatable into models that can explore behavior of lakes under varying tectonic, accumulation, and watershed regimes. References: 1 Carroll & Bohacs, 1999, Geology 27:99; 2 Cohen et al., 2007, PNAS 104:16422; 3 Olsen & Kent, 1996, PPP 122,1; 4 Machlus et al., 2008, EPSL 268:64.

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General Information for this Meeting

Session No. 151--Booth# 234
Lake Cores: Climate Change and Tectonics (Posters)
George R. Brown Convention Center: Exhibit Hall E
8:00 AM-4:45 PM, Sunday, 5 October 2008

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