Carboniferous Cyclostratigraphy and Relative Sea Level History, Donets Basin, Ukraine

Eros, James M.[1]; Montanez, Isabel [1]; Osleger, David A.[1] (1) Geology, University of California, Davis, Davis, CA.

The Donets Basin of Eastern Ukraine preserves a Carboniferous record of near-continuous, rapid sedimentation in an aulacogen of the European craton. We present a relative sea level history of this basin based on more than 200 high-resolution core logs and more than 20 outcrop sections that together define clear stratigraphic and spatial trends. Recently developed, high-resolution time constraints calibrate these records to an unprecedented degree (Davydov et al., 2008). Donets Basin sedimentation during the Late Paleozoic Ice Age (LPIA) can be broadly characterized in terms of three facies assemblages, reflecting a paralic depositional environment with fully marine to fully terrestrial paleotropical deposits. Facies belts group into widely correlable, regularly repeating (cyclic) sequences that meet the definition of cyclothems. These cyclothems constitute composite sequences, with bundling of cyclothem sequences showing longer-term sea level trends. More than 240 cyclothems can be described for a 30 my period of the Carboniferous, reflecting sea level change on the short to long term during the onset and apogee of the LPIA. These records show at least six major relative sea level regressions with major sea level transgressions following these events. Six intervals interpreted to represent potentially globally ice-free conditions or glacial minima are indicated, with at least six discreet periods corresponding to glaciation recorded. Periods of regional aridity are also inferred (intercalated limestones and evaporites, evaporite deposits) for periods of high-latitude glacial minima while increased coal deposits and indicators of increased regional seasonality and humidity define periods of glacial maxima. These findings are in broad agreement with recently-developed high-latitude sedimentary records of LPIA glaciation.