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Synchronized accumulation rate and facies change between the Argana (Morocco) and eastern North American Triassic-Jurassic basins

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Quantitative correlation of the Argana basin with the Newark basin APTS 2010 and other eastern North American Triassic-Jurassic basins based on paleomagnetic polarity stratigraphy and pervasive orbitally-paced lake level cycles shows that they evolved through time in a remarkably synchronized pattern during the Late Triassic. The accumulation rate histories of the basins are segmented into correlative intervals lasting millions of years with little change in the long-term accumulation rate (at the 400-kyr-scale) punctuated by abrupt transitions between segments, despite each basin having its own characteristic accumulation rates. Large-scale facies packaging and depositional environments also changed synchronously between basins. These synchronous quantitative and qualitative patterns are very surprising, given simple models of basin growth, suggesting that there was some kind of compensation in sediment input for the increasing surface of the area of the basin through time. These correlated changes in the accumulation rate and facies in these basins suggests a very large-scale linkage, at the plate-tectonic scale, perhaps with some kind of balance between extension rates, basin accommodation space, and regional drainage basin size. Given that all of the central Atlantic margin basins, for which there is accumulation rate data, show these correlative patterns, we can predict that the others, for which data is not available, are likely to have followed a similar path.