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**TITLE:** Implications of a Widespread Airfall Tuff in Jurassic Lacustrine Rift Strata, Eastern USA

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**ABSTRACT BODY:** A thus far unique 5 mm graded ash has been identified in a deep-water phase of a single precessionally forced lacustrine cycle in the East Berlin and Towaco formations of the Newark and Hartford rift basins over a distance of 230 km. The tuff contains ~ 0.1 mm long, high-aspect ratio, euhedral plagioclase laths with no signs of rounding in a matrix of red clay or chalcedony that was originally glass and fine-grained feathery feldspars. Distinct sub-mm volcanic fragments are present at the base of the graded sequence. The ash has been found in two cores and one outcrop in the Newark basin and four outcrops in the Hartford basin always in a microlaminated whole-fish-bearing organic-rich dolomitic mudstone deposited in a deep meromictic lake. No significant grain size, petrologic, or bed thickness changes are evident along the entire distance the tuff has been identified suggesting that it is the distal portion of an ash plume of a single very large explosive eruption, distinct from any of known flows of the of the Central Atlantic Magmatic Province (CAMP) that are interbedded with the basin sequences.

The presence of this unique ash demonstrates unequivocally that the correlation of precessionally-forced cycles both within and between each of now-distinct Newark and Hartford basins previously proposed is correct. In addition, detailed comparisons of the laminae patterns reveal not only that the transgression and high stands of the lakes in each basin were precisely in phase, but also that the centennial to interannual variations in laminae production were the same in the two basins at the varve-scale. This locking in of variation between the two lakes suggests they were in fact connected, at least at high-stand, for we have been unable to find similarly matching non-glacial varve sequences elsewhere in hydrologically separate lakes of any age. In turn, this suggests the lake into which this ash fell was vastly larger than the current basins and because the Newark basin is still connected to the more southern Gettysburg and nearly connected to the Culpeper basin, the total size of the lake could have been over 800 km long, making it larger than any known lake, save land-locked seas.

This is the first time a true air fall tuff has been identified in any of the Central Atlantic margin rift basins and suggests a type of volcanism not recognized for the CAMP and perhaps originating from a completely different source.

**KEYWORDS:** [8404] VOLCANOLOGY / Volcanoclastic deposits, [8428] VOLCANOLOGY / Explosive volcanism, [1135] GEOCHRONOLOGY / Correlative geochronology, [3399] ATMOSPHERIC PROCESSES / General or miscellaneous.

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