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Extreme abundance of ammonoids in mass accumulations from the Late Devonian of the Moroccan Anti-Atlas

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The eastern Anti-Atlas is renowned for its highly fossiliferous outcrops of Devonian rocks. Ammonoids occur in rock-forming numbers at many localities in the Tafilalt and Maïder. This study addresses the questions of how many ammonoids are preserved within a standardized area as well as over the whole Tafilalt and Maïder basins, and how these mass occurrences formed. Five samples from the Tafilalt and Maïder were analysed. The ammonoids contained therein were prepared, measured and counted as a base for estimates of the orders of magnitude of the total number of preserved ammonoids and their biomass within the respective Famennian strata in the eastern Anti-Atlas. Two samples were stratigraphically assigned to the lower Famennian, two samples to the middle Famennian and one sample to the upper Famennian. For these samples, estimates for a standardized area of 1 km^2 and a layer thickness of 100 mm lie between 19.9×10^9 and 1.25×10^{10} ammonoids. The estimated numbers for the whole study area with a retrodeformed size of 15 512.5 km^2 and a sediment thickness of 100 mm, ranges from 30.9×10^{13} to 19.4×10^{14} ammonoids and a annual accumulation of 15.4×10^9 to 97.1×10^9 ammonoid conchs. This corresponds to a annual total palaeo-biomass that ranges from 25 954 t to 47 058 t within the whole study area and from 1.67 t to 3.03 t within an area of 1 km^2. Based on these results and size-distribution in the samples, the ecological role of the small and highly abundant, subspherical ammonoids from the early and middle Famennian is discussed and reproductive rates are estimated. With ca. 230 eggs produced by an adult female, cheiloceratids and small maeneceratids from the early Famennian deposits are at the lower end of ammonoid reproductive rates.

Key words: Cephalopoda, Ammonoidea, palaeoecology, biomass, fecundity, Famennian, Anti-Atlas.

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