TAPHONOMY OF THE PISCO KONZENTRAT- AND KONSERVAT-LAGERSTÄTTE (MIOCENE, PERU)

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Among the most outstanding Cenozoic marine Fossil-Lagerstätten worldwide, the Peruvian Pisco Formation is renowned for its exceptional preservation and abundance of fossil vertebrates, especially cetaceans. We present an updated overview and interpretation of taphonomic data gathered during fifteen field campaigns (2006-2019) on 890 fossil marine vertebrates from the Miocene strata of the Pisco Formation exposed in the Ica Desert. In order to assess the factors that led to the formation of such an exceptional Konzentrat- and Konservat-Lagerstätte, we made observations that range from the taxonomic distribution, articulation, completeness, disposition and orientation of skeletons, to the presence of bite marks, associations with shark teeth and macro-invertebrates, bone and soft tissue (i.e., baleen) preservation, and the formation of attendant carbonate concretions and sedimentary structures. We propose that the exceptional preservation and abundance of the Pisco Formation specimens cannot be ascribed to a single cause, but rather to the interplay of favorable palaeoenvironmental factors and suitable timing of mineralizing processes, such as: i) low concentration of dissolved oxygen at the seafloor; ii) the early onset of mineralization processes; iii) rapid burial of the carcasses; and iv) original biological richness in the southeastern Pacific. Our observations provide a comprehensive overview of the taphonomic characteristics of one of the most significant fossiliferous deposits of South America and lead to the

elaboration of a complex scenario for the preservation of its marine vertebrates that might serve as a reference for explaining the formation of other marine vertebrate Fossil-Lagerstätten worldwide.