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Arduino to Zalasiewicz: standardizing geological time, with special focus on the Quaternary



The mining engineer Giovanni Arduino in 1759 was among the first to subdivide geological time, based on his observations of the Venetian and Tuscan regions of Italy. Remnants of his is fourfold (chrono-) lithostratigraphic subdivision survive to this day: the Tertiary and Quaternary systems. During the 19th century, the Primary and Secondary of Arduino were replaced with the fossil-based Paleozoic (Sedgwick, 1838) and Mesozoic (Phillips, 1840), and most of the currently used system names were then introduced. However, to address weak standardization in stratigraphic terminology, the 1st International Geological Congress (IGC) was held in Paris in 1878. This IGC identified needs and formulated questions to be addressed three years later at the 2nd ICS in Bologna. Modern chronostratigraphy was thus born in Bologna in 1881, including the establishment of the International Commission on Nomenclature, which is the forerunner of the current International Commission on Stratigraphy (ICS). A major innovation occurred during the 18th IGC in London, 1948 with the introduction of a new paradigm, the global boundary stratotype section and point (GSSP).

During the London 1888 and Paris 1900 IGCs, successive attempts to remove the Quaternary failed. Nonetheless, the ICS, beginning in 2004, attempted to suppress the Quaternary as an official term. This move was resisted strenuously by the ICS's own Subcommittee on Quaternary Stratigraphy (SQS), and in 2009 the Quaternary was defined with a GSSP dated at 2.58 Ma. This required lowering the base of the Pleistocene to the same level. Although the Quaternary is secure for now, its subdivision presents challenges. The most controversial concerns the "Anthropocene", a suggested new epoch which is being championed by a working group of the SQS under the leadership of Jan Zalasiewicz. My talk reviews the ongoing evolution of the geological time scale, illustrates the importance of following due process, and critically examines the case for the "Anthropocene" as a formal chronostratigraphic unit.