



Mining-related geochemical anomalies from 3500 to 2000 BP as potential stratigraphic markers for the base of the Anthropocene

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Besides major issues and challenges in defining the Anthropocene as a formal chronostratigraphic unit of the Geological time scale, the questions of how and when to define the base of the Anthropocene are one of the major challenges. Lower stratigraphic boundaries of an (early) Anthropocene are strongly debated because of the diachronic character of anthropogenic signals from the Holocene to the Anthropocene. A first significant, partly synchronous and non-local signal for anthropogenic contamination provides the record of mining/smelting-related trace metal pollution in the northern hemisphere at 3500 - 2800 BP with a peak roughly at around 3000 BP, and the subsequent Roman lead peak at around 2000 BP. These events, as defined by lead enrichment and changes in lead isotope ratios, accompanied by other trace metal enrichments, are found in several types of geological archives, i.e. Arctic ice cores, European peat bogs, speleothems, fluvial, lake and marine records. Potential correlations and secondary markers may be present using tephrochronology, climate events, and magnetostratigraphy. Such a definition of the base of a formally defined (early) Anthropocene allows the use of a GSSP (Global Stratotype Section and Point) concept by using a point in a physical archive, and allows for a much larger quantity of anthropogenic strata as evidence for an Anthropocene chronostratigraphic unit than a base definition in the mid-20th century.