The Anthropocene: overview of stratigraphical assessment to date


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We summarize evidence gathered to date to constrain and assess the Anthropocene as a potential new formal chronostratigraphic unit within the Geological Time Scale. Evidence of importance to the formalization question may be placed within the standard litho-, chemo- and bio-stratigraphic categories, while there are a number of novel phenomena. Lithostratigraphic evidence includes the appearance and rapid, near-isochronous, dispersal of many new mineral forms (including metals, plastics and industrial fly ash), rock types (including concrete and brick) and sediment bodies including artificial ground, landfill and marine trawl layers together with sediments released by land use changes. Humans now move more terrestrial sediment than all natural horizontal fluxes by water (rivers), wind (aeolian), and ice (glaciers). Chemostratigraphic evidence includes isotope patterns altered by perturbations to the carbon, nitrogen and phosphorus cycles at rates and magnitudes unprecedented in Quaternary times, atmospheric gas changes preserved in ice, disseminated metal and persistent organic pollutant and artificial radionuclides traces, many of which are novel signatures. Biostratigraphic evidence includes preservable consequences of extinctions, geologically unprecedented species invasions and marked assemblage changes. Recent climate and sea level trends are outside the Holocene trajectory, though global temperature and sea level are still within the Quaternary interglacial envelope. Anthropogenic influence on stratigraphic signals commenced thousands of years ago, but the most pronounced inflection in most trends away from Holocene patterns is in the mid-20th century. The evidence in sum may be used to justify an epoch-scale boundary, though questions of utility and of definition – including selection and detailed multiproxy analysis of candidate GSSP sections – remain. We provide a summary of the balance of opinion within the working group on the major questions regarding the geological reality, potential boundary markers, hierarchical level and formalization potential of the Anthropocene.