



The long-term geophysical and geochemical impacts of the global iron ore industry in the context of the Anthropocene debate

Kevin Mallinger (1) and Martin Mergili (2,3)

(1) Department of Geography and Regional Research, University of Vienna, Vienna, Austria (kevinmallinger@hotmail.com), (2) ENGAGE - Geomorphological Systems and Risk Research, Department of Geography and Regional Research, University of Vienna, Vienna, Austria, (3) Institute of Applied Geology, University of Natural Resources and Life Sciences (BOKU), Vienna, Austria

The discussion regarding the formal introduction of a new geological age, the Anthropocene, led to the sophisticated attempt of the AWG (Anthropocene Working Group) to investigate the long-term stratigraphical records shaped by human actions and to identify possible GSSAs (Global Standard Stratigraphic Age) and GSSPs (Global boundary Stratotype Section and Point).

The present matter tries to contribute to this endeavor and discusses the geochemical and geophysical implications of the global iron ore industry including the associated chains of production. To achieve this goal, a sophisticated literature research was conducted, which was mainly based on various LCAs (Life cycle analysis) and field studies.

The results are presented by means of the four stages of the iron ore cycle (Mining, processing, recycling and weathering) and help to illustrate the relation between the physical, chemical, biological, magnetic and sequential markers and the geochemical and geophysical effects of the iron ore industry. The potential markers vary greatly regarding their persistence and measurability, but key findings can be summarized as TMPs (Technogenic magnetic particles), SCPs (Spheroidal carbonaceous fly ash particles), HAHs (Halogenated aromatic hydrocarbons), heavy metals (Vanadium, mercury etc.), species extinction, steel input and steel corrosion as well as the emergence of iron ore related Technosols. Considering the temporal synchrony and global distribution of the stratigraphical records, potential candidates for the GSSP and the GSSA are highlighted.