



SPECIAL SECTION

The contemporary European copper cycle: The characterization of technological copper cycles

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Abstract

Copper is an example of an anthropogenically utilized material that is of interest to both resource economists and environmental scientists. It is a widely employed industrial metal, and one that in certain forms and concentrations is moderately biotoxic. It is also one that may be potentially supply-limited. A comprehensive accounting of the anthropogenic mobilization and use of copper must treat a series of life stages: mining and processing, fabrication, utilization, and end of life. Reservoirs in which copper resides include the lithosphere, ore and ingot processing facilities, fabricators, at least a dozen major uses, several intentional and default stockpiles, landfills, and the environment. The flow rates among those reservoirs constitute the cycle. If a non-global cycle is being constructed, imports to and exports from the region of interest must also be included. In this paper we discuss the characteristics of each of the components of anthropogenic copper cycles, as well as generic approaches to the acquisition and evaluation of data over space and time. Data quality and data utility are evaluated, noting that information relevant to technology and resource policy is easier to acquire than is information relevant to human health and ecosystem concerns, partly because the spatial scale required by the latter is considerably smaller and the flow rates rarely analyzed and reported. Despite considerable data limitations, we conclude that information is sufficiently available and the data sufficiently accurate to characterize copper cycles at a variety of spatial scales.

Keywords

Copper reservoirs; Copper flows; Technological cycles; Substance flow analysis

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