

The metabolic urban network: Urbanisation as hierarchically ordered space of flows

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Abstract

Urban ecosystems perform a distinctive metabolism appropriating fundamental materials and energy resources from other ecosystems. This appropriation enables a productive circularity which sustains the material production of urban space: urbanisation. Upon entering the urban ecosystem, the material fluxes are processed by human labour to be consumed, exchanged and accumulated. The appropriation of raw materials and the further production of technomass are entangled processes along a complex material circulation, sustained by internal metabolic processes of production, consumption, transformation and accumulation. The overall process couples several ecosystems along a metabolic urban network (MUN), a large-scale interconnected metabolism of urban and non-urban ecosystems. Long and short distance metabolic interactions configuring a huge space of flows from which distinct urbanisation patterns arise. The extended urbanisation, differential urbanisation, accumulative urbanisation, cascade urbanisation and speculative urbanisation are historically and ecologically determined. The MUN is an asymmetric spatiotemporal exchange structure to and from which matter, energy and information flow, producing profound socio-ecological asymmetries in a global range of dispersed urban tissues. The MUN is the vortex where the planetary processes of ecological and social deterioration is driven. The MUN is an analytical device to unveil urbanisation as a socio-ecological process of colonisation of urban and non-urban ecosystems.

Author keywords

Circular economy

Material cycles

Technomass

Urban ecosystem

Urban metabolism