

Urban Metabolisms in Context: A Comparison of American and French Urban and Suburban Communities

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Abstract

Understanding the similarities and discrepancies between the metabolic activities of urban and suburban neighborhoods in various contexts is crucial to enhancing effective resource management and sustainability. Yet, research focusing on the spatialization of Urban Metabolism (UM) comparing the metabolic characteristics of compact urban centers and spatially dispersed suburbs across different international contexts is notably lacking. This gap therefore raises important questions: do dense city centers and suburbs exhibit similar metabolic characteristics worldwide? How do specific spatial attributes influence neighborhood metabolism? To address these questions, we conducted a comparative analysis of the metabolism of four neighborhoods located in the metropolitan areas of Paris (France) and Boston (United States): République and Back Bay, representing compact urban centers, and Noisy-Champs and Westwood, representing dispersed suburbs. To do so, we developed dynamic metabolic models at the scale of the neighborhood, using QGIS, Excel, and Sankeymatics. The findings reveal that, although density and spatial characteristics contribute to certain similarities in metabolic processes across the sites, these similarities are constrained by the use of specific material resources and construction technologies, which are highly context-dependent.

Keywords

Urban metabolism, material flow analysis, material stock-flow density, population density, construction technology.

Conflict of Interest

The authors declare no conflict of interest.

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Data Availability Statement

All data generated or analyzed during this study are included in this published article and its supplementary information files.