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Evolution of Soundscape Mapping: Insights from a Bibliometric and Spatio-thematic Analysis (1980–2026)

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Abstract:

The field of critical cartography, following the cartographic paradigm shift of the 1980s, opens the possibility of revealing underestimated aspects of space and unorthodox views excluded by the canons of conventional cartography. Harley and Woodward (1987) describe this process as a series of cognitive transformations leading toward an awareness of 'the idea of the map' as a basic form of human communication. In this respect, cartography aims to map not only physical geographies or terrains, but also human geographies or genius loci. Narratives about the sonic environment have strong implications for human geography, including habits, culture, religion, place identity, and memory.

This research argues that incorporating aural knowledge and sonic integration in map design facilitates spatial processing, enhances perceptual engagement, and enriches cartographic epistemology. While the concept of soundscape was introduced in the late 1960s to understand how auditory perception defines environments (Southworth, 1967; Schafer, 1977), its cartographic representation remained a peripheral concern for decades. This study addresses the sparse nature of literature regarding the evolution of soundscape mapping, aiming to map the geography of knowledge at the intersection of soundscape and cartography.

To identify research hotspots and emerging directions, this article employs a dual-layered approach: a bibliometric analysis coupled with a spatio-thematic investigation. Data was retrieved from the Web of Science (WoS) Core Collection using a refined boolean search string targeting 'soundscape' and 'mapping' within titles, abstracts, and keywords for the period 1980–2026. The bibliometric analysis utilizes the R-package and CiteSpace to generate metrics and visualize interrelations. This allowed for the identification of intellectual turning points in soundscape mapping discourse. The spatio-thematic analysis further categorizes how the *spatiality* of sound has been treated—moving from the purely Euclidean representation of decibel levels to the topological and relational mapping of perceived soundscapes.

The article illustrates how research themes and the ways sound is mapped have shifted over time. From 1980s to the mid-1990s, soundscape mapping was sporadically mentioned, primarily within the fields of musicology, landscape and urban planning, and architecture. As noted by Chung and To (2025), soundscape remained a relatively unexplored cartographic topic until the turn of the millennium. From the mid-1990s onwards, resulting from advances in digital technology, new sets of tools for the multimodal map making process emerged, which paves the way for sonic integration as well. In the meantime, especially since the early 2000s, special issues in academic journals, sessions at international conferences, and a series of ISO standards documents (since 2014) have led to an increasing number of publications on soundscape mapping. The bibliometric analysis underscores that soundscape mapping has evolved into a multidimensional field intersecting sustainability, cultural heritage, and advanced computation over the last decade. It also indicates the emerging cross-disciplinary nature of soundscape studies. Additionally, the spatio-thematic analysis demonstrates a transition from static 2D mapping to interactive, immersive, and multimodal environments. Raddicchi (2017) notes the increasing trend toward interactive online sound maps and mobile applications as the primary interfaces for soundscape mapping. This article highlights a growing integration of crowdsourcing, GIS-based modeling, Virtual Reality (VR), Augmented Reality (AR), and Machine Learning (ML) into cartographic workflows of soundscape research. This era emphasizes the 'Cartographer in the Loop', where the map-maker facilitates a dialogue between big data and human sensory experience. The shift from quantitative, prescriptive surveys toward qualitative, perceptual mapping reflects a broader move in cartography toward valuing the lived experience. Overall, by identifying these historical trajectories and research gaps over nearly five decades, this study demonstrates how the field has grown, shifted, and matured, and provides a strategic framework for the next generation of cartographic representations in soundscape research.

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