Spatiotemporal decoupling of littoral and lacustrine geosmin dynamics: Implications for early warning in drinking water reservoirs

Highlights

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- Unveils littoral zone as the critical initiation hotspot for reservoir odor
- Develops a dynamic early-warning model integrating multi-source sensing data
- Proposes targeted intervention protocol based on odor source-pathway identification
- Validates framework via cross-seasonal, multi-reservoir field campaigns