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Case study of a fast propagating bacteriogenically induced concrete corrosion in an Austrian sewer system

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Reaction mechanisms leading to microbially induced concrete corrosion (MICC) are highly complex and often not fully understood. The aim of the present case study is to contribute to a deeper understanding of reaction paths, environmental controls, and corrosion rates related to MICC in a modern Austrian sewer system by introducing an advanced multi proxy approach that comprises gaseous, hydro-geochemical, bacteriological, and mineralogical analyses. Various crucial parameters for detecting alteration features were determined in the field and laboratory, including (i) temperature, pH, alkalinity, chemical compositions of the solutions, (ii) chemical and mineralogical composition of solids, (iii) bacterial analysis, and (iv) concentrations of gaseous H2S, CH4 and CO_2 within the sewer pipe atmosphere.
An overview of the field site and analytical results, focusing on reaction mechanisms causing the corrosion, as well as possible remediation strategies will be presented.