

Airborne pathogenic bacteria risk related to a storm water retention basin

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Stormwater management is a major concern for urban areas, especially within the context of increasing urban development and climate change. The Greater Lyon (France) is engaged into a sustainable water management. The Django Reinhardt infiltration basin is part of it. Its catchment area is a 185 ha industrial zone, highly impervious, drained by a stormwater separate system. Only stormwater are managed by the basin and, intermittency, some waters, which come from cooling of industrial process and considered as clean, can be injected in rain pipe networks. Django Reinhardt basin is composed by two compartments: one for sedimentation, to get rids of suspend pollutants, and one to infiltrate decanted water. A recent sedimentological study has shown the presence of pathogens bacteria (Sebastian et al., 2014), which can be aerosolized and disseminated into the local environment. This situation exposes surrounding population to a bacterial contamination risk, no yet qualified nor quantified (Lipeme Kouyi, 2014). This study aims to measure this aerosolization, examines extend of the potentially generated plume and its impact on the surrounding population. The final objective is to improve the knowledge and management of this risk. To ensure this objective, the project is highly multidisciplinary and associates skills of life sciences (microbiology) and social and humans sciences (anthropology and geography). The interactions between hazard and vulnerabilities of assets are taken into accounts to get a global vision of this risk. Spatial hazard characterisation is considered as a crossing between dispersion climatic factors, particularly the wind, and abilities of bacteria to survive under local environment. The area considered for exposure is a 1 km buffer zone around the basin, in accordance to previous studies (Dugan, 2014; Kazmierczuk and Bojanowicz-Bablok, 2014). However, to achieve spatial and pathogenicity plume extend (figure 1), inactivation bacteria during airborne must be include. To get a better consideration of local diversity land uses, a visual interpretation is conducted on aerial pictures (10 cm resolution). It allows to improve vulnerability characterisation by considering physical activities or temporality occupation of identified land parcels. First results indicate that the potential plume generated may extend on a N/S transect and affect three different areas: an industrial zone; a residential zone where some sport fields are locted; and an international conference hall (Eurexpo).

This work was supported by the LABEX IMU (ANR-10-LABX-0088) of Université de Lyon, within the program Investissements d'Avenir (ANR-11-IDEX-0007) operated by the French National Research Agency (ANR).

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Keywords: water, hazard, bacteria, Lyon (France)

