

Geostatistical mapping of health risks to improve decision making when regenerating contaminated sites (CARTORISK project)

Claire Faucheux (Geovariances), H el ene Demougeot-Renard (eOde), V eronique Croze (Element-Terre), Sylvie Traverse (Ginger Burgeap)

Redevelopment of industrial sites is a complex task which requires looking for the best compromise between several development alternatives. Reduction of health risks associated with site pollution must be balanced against remediation costs for various exposure scenarios depending on the construction projects and related uses. This analysis is particularly difficult in the highly uncertain context encountered in most of industrial sites. Site contamination is indeed always imperfectly known, due to the high complexity of spatial pollution distribution in soil or transfer media and the limited number of data collected during the investigation stage.

Mapping health risks linked to each redevelopment scenario while accounting for the spatial variability of soil contamination together with an estimation of related uncertainty can help decision making. It can also be used to estimate costs of remediation required to reduce risks.

Such a mapping can be obtained by coupling geostatistical models using soil, groundwater and soil gas results with pathways models and health risks computations. If this coupling does not raise any theoretical problem, its application should be examined in detail. Some challenging issues are expected both in the technical development of the methodology (e.g. accounting for models with various dimensions) and with the integration of the spatial risk models during the redevelopment operations and decision making process (e.g. how to bring practical benefits to the actors as city planners or real estate companies for industrial sites redevelopment?).

Cartorisk is a two-year project funded by Ademe (French Environment and Energy Management Agency) and conducted by four partners: eOde, Geovariances, Element-Terre and Ginger-Burgeap. The project has 3 main goals: 1) develop a general methodology for risk spatialization, 2) test the method on two industrial sites showing contrasted contamination situations, exposure pathways and redevelopment scenarios, 3) define with a panel of experts how to integrate the method in their decision making process to maximize the overall benefit of the re-urbanization operations.

The methodology developed in the framework of Cartorisk will be presented and illustrated with the two real cases of post-industrial sites. Difficulties and remaining challenges to obtain an efficient and workable method will be discussed.