METHODS AND TOOLS FOR HEALTH RISK ASSESSMENT

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The assessment of human health risk due to the use of dangerous substances in anthropic activities is a topic of growing interest for both citizens and public authorities. As a matter of fact, the former want to know the influence that such substances have on changing life conditions and the latter must establish rules and regulations to guarantee a safe exposure to them, if there is. Human health risk is assessed through a procedure based on identification, evaluation and management. As given in Fig. 1, the global evaluation procedure can be profitably conducted by using the capabilities of Geographycal Information Systems able to describe the spatial distribution of sources of Chemicals of Concern (CoC), of their dispersion in air, water and soil established through fate and transport models and finally able to draw maps of cancer risk or of hazard quotient, if dangerous substances are involved, being carcinogenic or not. The research activities of the group were and are focused on all the aspects of the procedure: methodological contents, simple or complex environmental models, dose – response models of dangerous substances, uncertainties evaluation and tolerability criteria; all these topics have to be deepened if we want to give an actual and credible picture of health risks of human beings living in a territory. The software code EHHRA-GIS includes all the models previously cited; it has been built by research group step by step following innovations in fields involved, especially in modeling, and technical regulations established by national authorities. At present this tool can manipulate several sources due to industrial and civil activities or to transport, being both continuous or accidental ones (see, as an example, Fig.2). Maps of individual risk produced by one or several substances, histograms on risk importance of substances and on the most relevant ways of intakes (by ingestion of foods, by drinking of water or different beverage,….) are some of the several results which can be obtained by the code. It has to be outlined that all values are useful and important in order to support the job of territorial authorities in a correct management of risk.

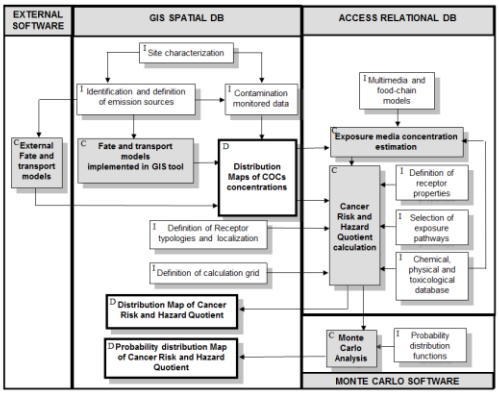

Fig.1 Architecture block diagram of the methodology in EHHRA-GIS

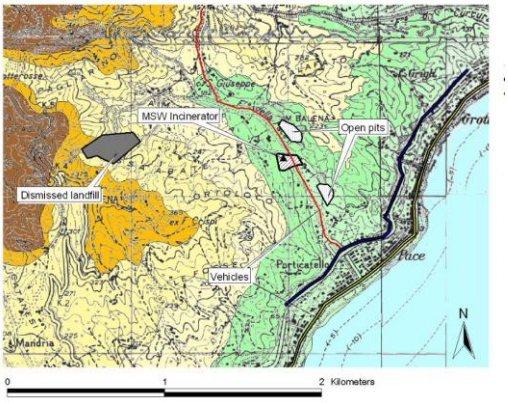

Fig.2 Map of terrain elevation showing different sources of contamination

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RESEARCH PROJECT

Attività di Protezione Civile di competenza regionale in materia di rischi connessi con le attività' industriali e i trasporti di sostanze pericolose. Research contract between Regione Emilia-Romagna and Department of Chemical, Mining and Environmental Engineering (DICMA), DICMA person responsible: Gigliola Spadoni, (2004-2008).

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