

SoilRemediation: a plugin and workflow in Gocad for managing environmental data and modeling contaminated sites

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Contaminated sites have become a common concern of all industrial countries. This is particularly true in Europe and North America where generations of industry have followed one another, leaving behind numerous contaminated lands. Whether environmental, health, social or economical issues are to be addressed, remediation of contaminated soils remains the only solution to eliminate contamination hazards (sources) and to allow safe access or reuse of these areas. Cleanup or risk standards must be attained that fully condition the volume of contaminated soils to dig out or process, hence the remediation costs.

Geostatistics provides suitable methods for modeling soil contaminations, from which contaminated soil volumes and attached uncertainties can be estimated and delineated more accurately. Dedicated geostatistical approaches and techniques are required, however, to take into account appropriately the specificities of soil contamination and remediation data.

- Multiple (up to 15 or more) correlated contaminants are to be considered all together.
- Contrasted but correlated soil contaminations may be found in different soil layers or types (facies), thus requiring that correlated variables (contaminant grades) be co-simulated in separate soil domains.
- Contaminant grade distributions are generally highly skewed and may contain a high proportion (peak) of under detection-limit data, thus leading to data analysis and transformation issues.
- Specific post-processing tools are needed to classify soils as contaminated or safe against risk-based regulatory thresholds that are contaminant-dependent and may vary from one zone to another or with depth depending on site redevelopment choices (dwelling, offices, gardens, car parks, etc.).
- Decision-making tools are required to manage uncertainties for remediation strategy purposes.

SoilRemediation is a plugin and workflow in Gocad that implements such a suitable geostatistical approach and make available appropriate tools for storing, managing, analyzing and visualizing site environmental and contamination data (see Figure 1). The paper presents the workflow and illustrates its use on actual case studies.

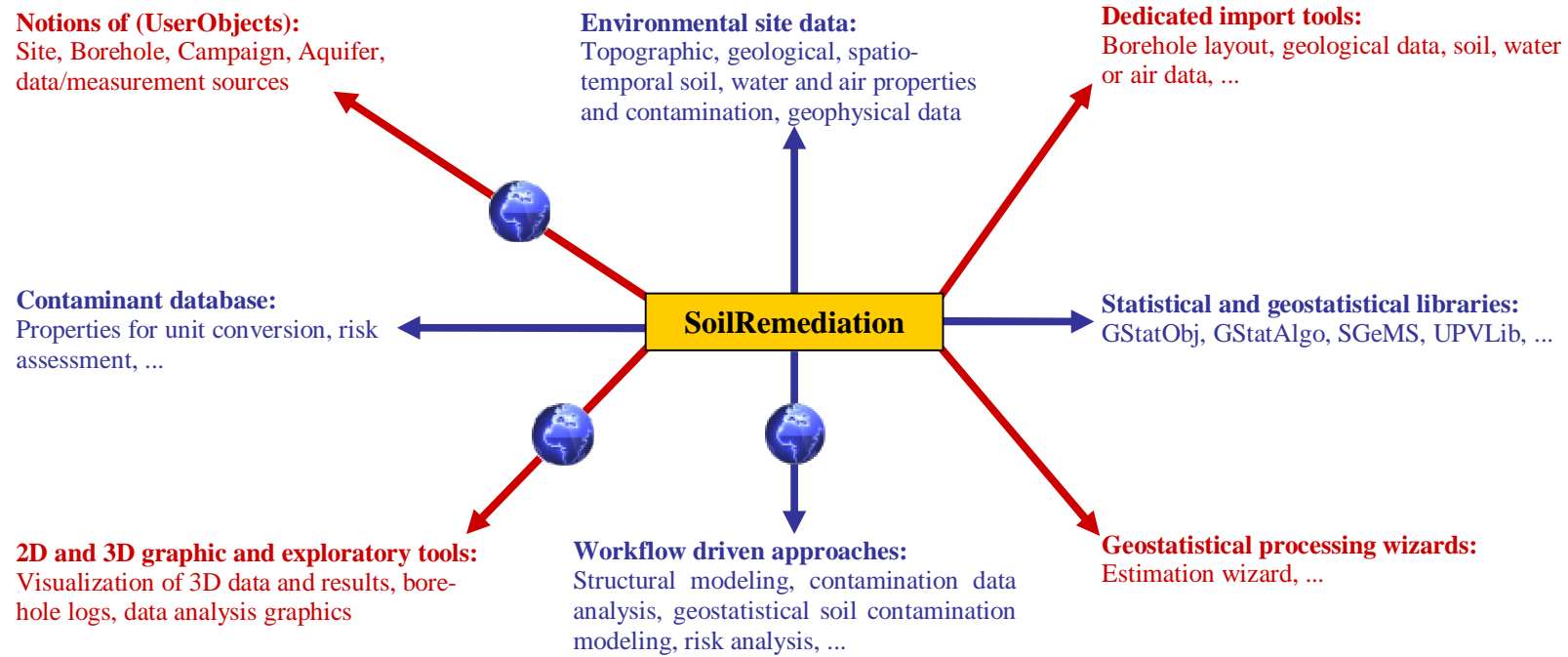


Figure 1: Overview of SoilRemediation.