TERRA Sys 1.0

Ecotoxicological
Risk Assessment
of Contaminated Sites

Professional Software

What is

TERRA⬛Sys ?

TerraSys is the first professional software program to combine all the tools required for ecotoxicological risk assessment.

Developed primarily for cases involving contaminated soil, TerraSys possesses the tools necessary to evaluate various situations involving toxic substances in the environment, whether in terrestrial or aquatic habitats. The numerous databases integrated into the software can be edited by the analyst. This gives TerraSys a capacity so far unequalled for performing ecotoxicological risk assessments on combinations of receptors and contaminants for which no reference values are currently available.

User-friendly…

The advanced interface of TerraSys incorporates numerous functions which facilitate definition of the conceptual model of the ecosystem, mapping of contaminant concentrations, data entry and consultation of results. TerraSys also includes extended context-related Help functions, which provide appropriate instructions to the user at all times.

A complete tool…

TerraSys brings together all the tools required for the conduct of risk assessments in a single software program. All the stages of an analysis, from data entry to final risk evaluation, are undertaken in a coherent and integrated manner.

TerraSys includes unprecedented new functions which extend its capacities well beyond traditional models. These functions include geo-statistical treatment of characterisation data, functions for the calculation of dose/response relationships and sensitivity distributions integrated with ecotoxicological databases, a method of calculating risk indices from the results of biotests, etc…

The principal functions of TerraSys

- functions for the treatment of contaminated soil characterisation data (statistical and geostatistical treatments, mapping, etc.)

- functions for the definition of conceptual models of ecosystems

- functions for modelling multi-media concentrations, for modelling exposure and for the calculation of risk indices for all types of ecological receptors, in terrestrial or aquatic habitats

- functions for the integration of biotest results with the risk indices calculated according to the traditional modelling approach

Remarkable analytical power…

TerraSys is mainly based on recognised and well documented models. Its analytical capacity rests on a powerful algorithm permitting the modelling of concentrations and receptor exposure levels even in complex systems composed of multiple trophic levels.

A number of new models are also included, in order to allow the assessment of risks for all types of ecological receptors. Detailed documentation accompanies the software and provides all the technical and scientific information required.
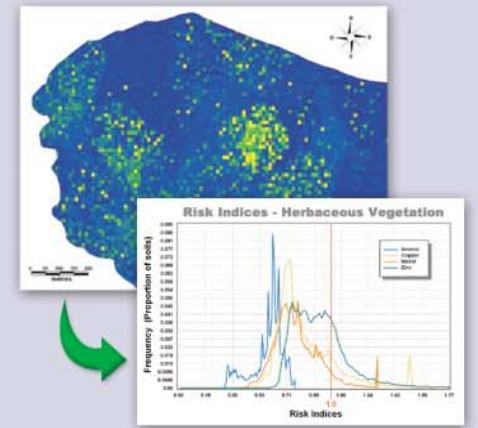
Geostatistical treatment and estimation of the volume of soil presenting a risk
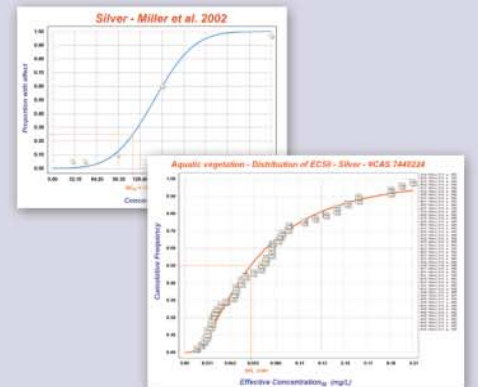
Generation of reference values from ecotoxicological databases
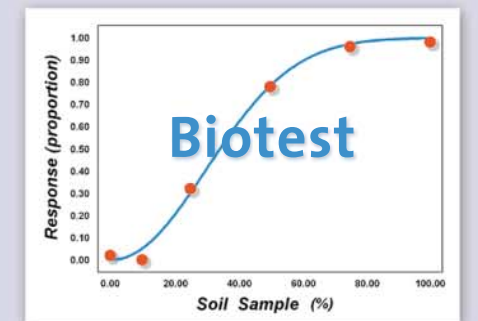
Calculation of risk indices from biotest results

Graphs of results

CONCEPTUAL MODELS

▸ A powerful user-friendly interface for the elaboration of conceptual models of the ecosystem(s) under study

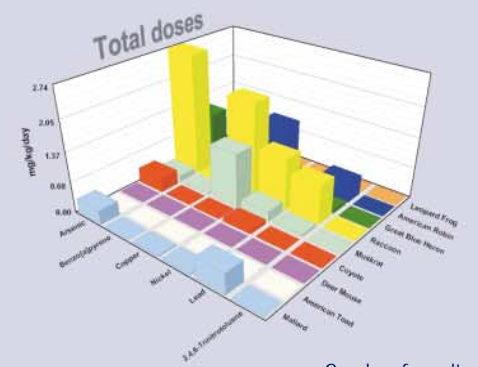▸ Support for three types of aquatic habitats : intermittent pools, watercourses (streams/rivers) and water bodies (lakes/ponds)

▸ Types of ecological receptors considered :

- Herbaceous vegetation
- Shrubbery
- Arborescent vegetation
- Soil micro-organisms
- Soil invertebrates
- Terrestrial and aerial invertebrates

- Aquatic micro-organisms
- Phytoplankton / periphyton
- Zooplankton
- Macrophytic aquatic plants
- Aquatic invertebrates

- Fish
- Amphibians
- Reptiles
- Birds
- Mammals

▸ Types of interactions considered in the definition of the conceptual model :

- Adsorption / desorption
- Atmospheric deposition
- Bioconcentration
- Competition
- Commensalism
- Degradation
- Deposition of organic material

- Diffusion
- Dilution
- Direct contact
- Dispersion
- Evaporation
- Foliar fixation
- Gas / particulate partitioning

- Infiltration
- Ingestion
- Inhalation
- Parasitism
- Predation / feeding
- Rainsplash
- Resurgence

- Resuspension
- Root absorption
- Runoff
- Shelter / supporting habitat
- Sedimentation
- Symbiosis
- Volatilisation

MODELLING

- Functions for geostatistical treatment of characterisation data, including an interpolation method and a newly-developed stochastic simulation method specifically designed for cases of heterogeneous contamination on urban sites
- Statistical functions for the treatment of characterisation data, including a variety of graphs
- Modelling of multimedia concentrations in all environmental compartments, biotic or abiotic; newly-developed models for the calculation of concentrations and doses in amphibians and terrestrial invertebrates
- Exposure modelling for all types of ecological receptors
- Estimation of risks for all ecological receptors, using reference values definable by the user ; 7 different methods that can be prioritised by the user, including the real-time calculation of reference values from ecotoxicological databases
- Calculation of distinct risk indices for background, additional and total concentrations
- Calculation of statistical distributions of ecotoxicological indicators (sensitivity distributions)
- Calculation of concentration/response or dose/response relationships according to three distinct models (normal, log-normal, Weibull), with calculation of ECx values
- Treatment of biotest data, including functions for the calculation of risk indices, and functions which search for correlations with measured concentrations and with risk indices calculated by the mathematical modelling approach
- "Smart" function for the integration of the results of the mathematical approach with the results of biotests

DATABASES

- Interactive databases of physico-chemical, toxicological and environmental properties of contaminants, covering over 100 common substances ; functions for editing, adding and deleting records, with calculation of numerous parameters using "structure-activity" type equations
- Databases on ecological receptors (aquatic macrophytes, fish, amphibians, reptiles, birds and mammals) covering more than 190 different species; functions for editing, adding and deleting records, with calculation of numerous parameters using allometric equations
- Ecotoxicological databases containing more than 18,000 records, which can be used for the real-time calculation of reference values as defined by the analyst
- Descriptive databases covering the most commonly used biotests for contaminated lands (EPA, OECD, etc.)
- Integrated default values for various soil types

USER ASSISTANCE

- User-friendly interface
- Direct reading of Microsoft Excel™ files containing characterisation data
- Text file editor for the production of reports, with automatic formatting functions configurable by the user
- Numerous text reports : analysis of the conceptual model, geostatistical modelling, multi-media concentration modelling, exposure and risk modelling
- Mapping functions : sampling stations, measured concentrations, calculated concentrations, biotests results, etc…
- Numerous interactive tools for assisting the user
- Extensive graphic functions, including a wide variety of formatting, editing, saving and printing options
- Genuine 3D graphs that can be pivoted in all directions
- Graphs of the distribution of risk indices as a function of the volumes of soil at various concentrations (for direct contact receptors)
- Complete copy functions for data and graphs
- Capacity for simultaneous treatment of 100 different contaminants, 1500 sampling stations, 100 ecological components and 1000 interactions (conceptual model)
- Detailed reference manual / Contextual "Help" system / Technical support

MINIMAL SYSTEM CONFIGURATION:

- Windows® NT 4.0, Windows 2000 or Windows XP™ operating system
- 256 Megabytes of RAM
- Screen resolution: minimum 1024 X 768 (1600 X 1200 recommended)
- Intel® Pentium® processor at 233 MHz or more, or equivalent
- 20 Megabytes of disk space for installation
- At least 100 Mb disk space available for running the software
- Mouse or other pointing device

INFORMATION

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