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S-Risk – A flexible model for human health risk assessment at contaminated sites

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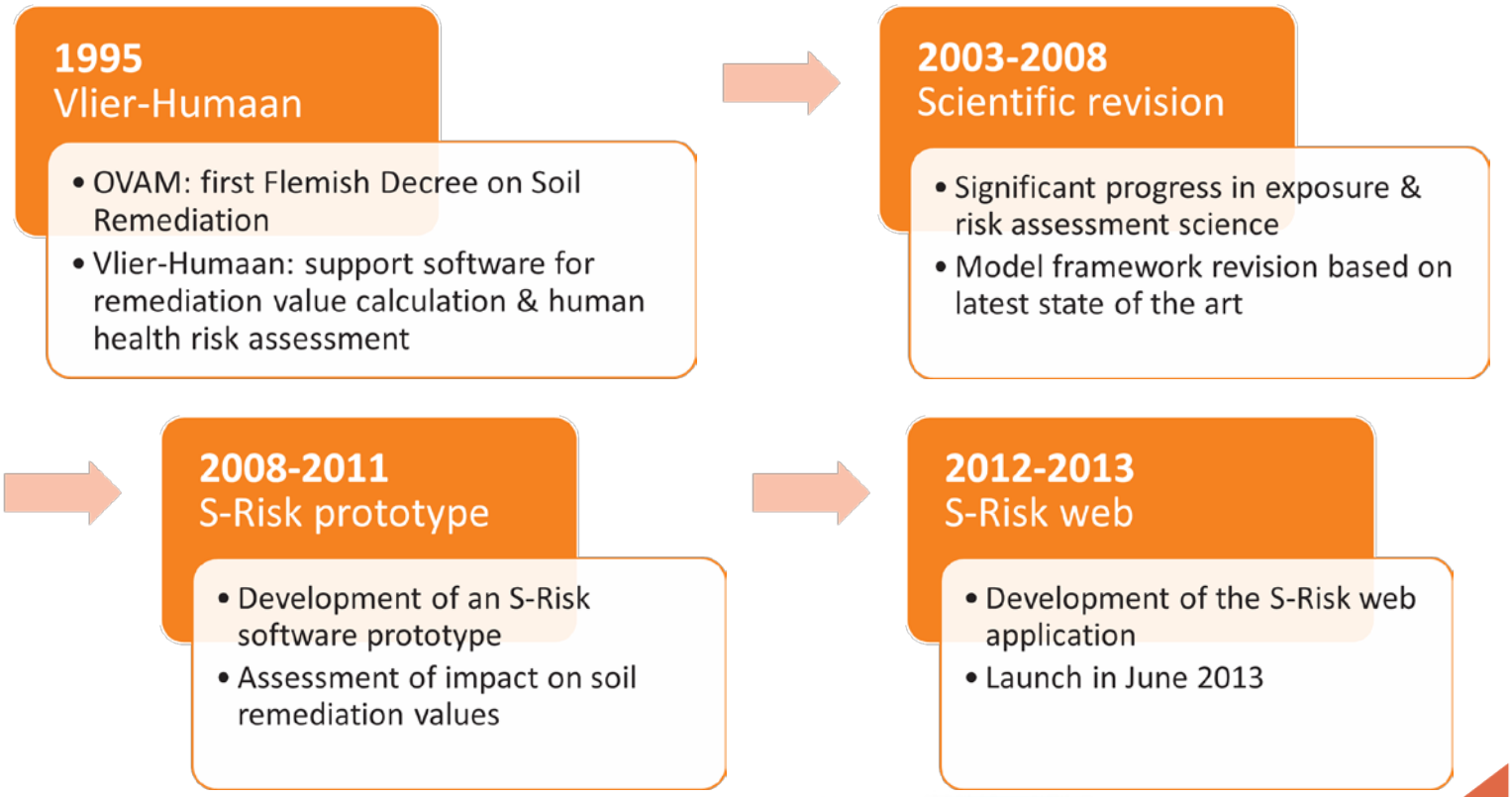
Contaminated sites 2015, Bratislava, 27-29 May 2015

S-Risk
contaminated Sites RISK Assessment

Background

Soil remediation policy & modelling health risks in Flanders (Belgium)



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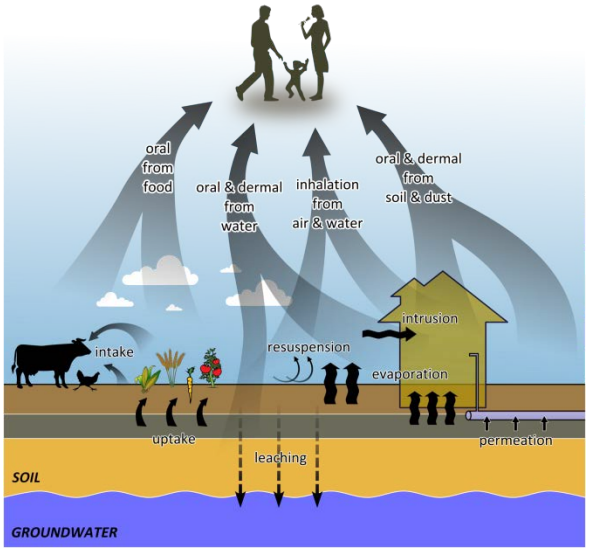
S-Risk
contaminated Sites RISK Assessment

Model description

- S-Risk can be used for the calculation of
  - Screening values (generic or site-specific)
  - Human health risks



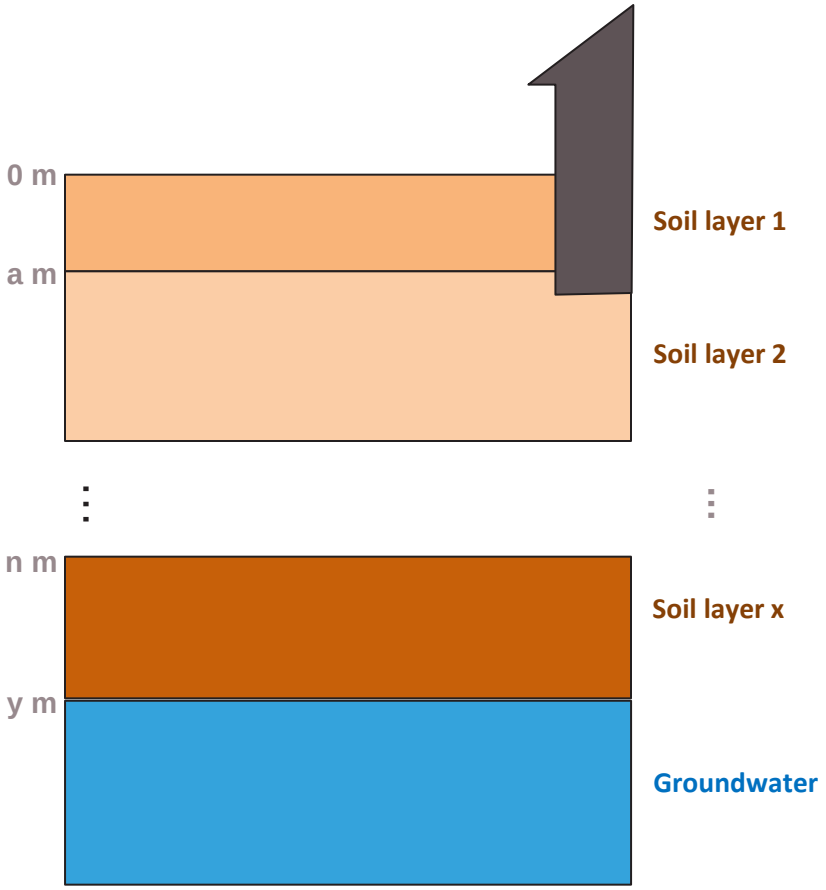
- 4 main modules
  1. Chemical distribution in soil & groundwater
  2. Transfer soil/groundwater → other environmental/biological media
  3. Human exposure
  4. Human health risks

Model description – module 1

Chemical distribution in soil & groundwater

- Each soil layer → chemical distribution
  - Solid phase
  - Water phase
  - Gas phase
- Groundwater → chemical distribution
  - Water phase
  - Gas phase

  At boundary between groundwater layer & unsaturated zone (assumption: equilibrium partitioning)



Model description – modules 2 & 3

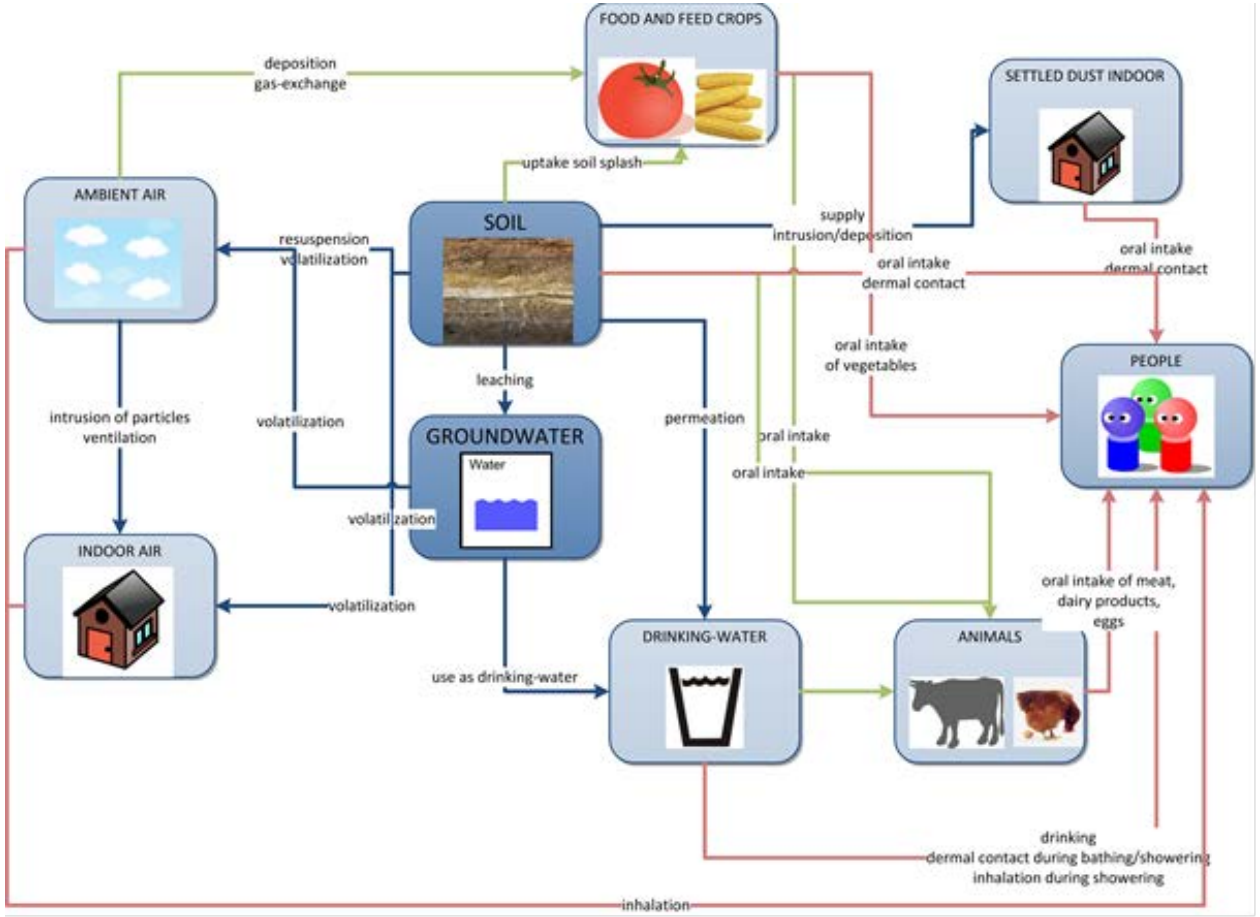
Transfer & exposure

Soil/groundwater

Other envir. media

Biological media

People (1-70 y.)



Model description – module 4

Calculation of human health risks

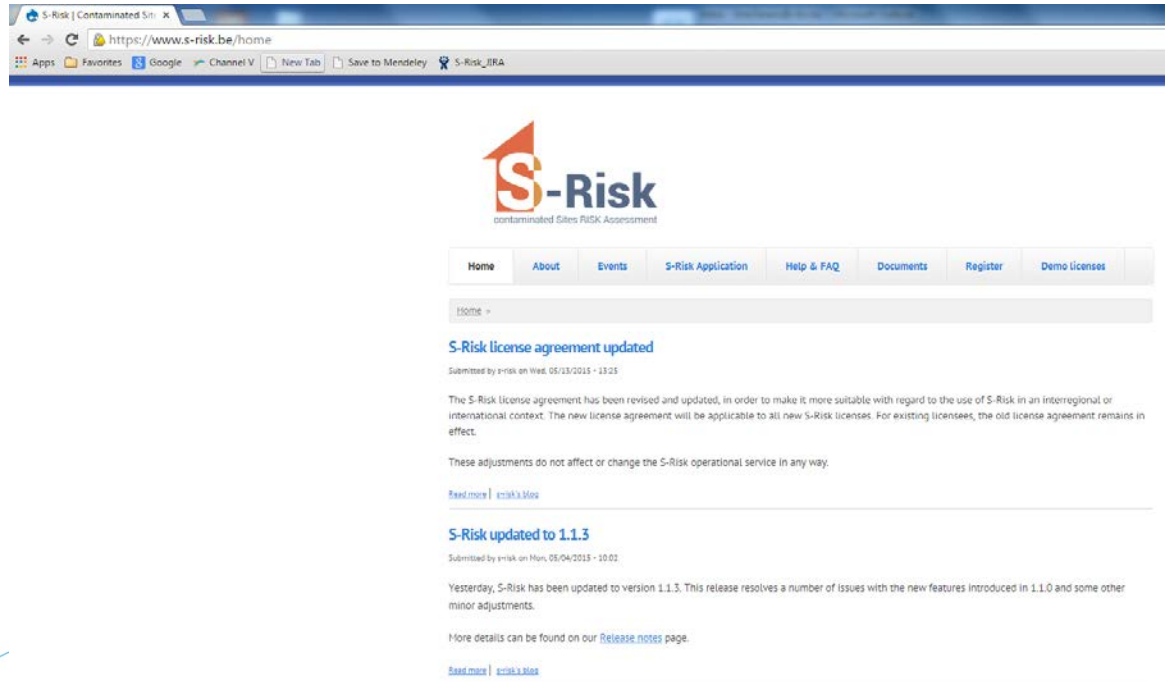
» Compare calculated exposures with toxicological reference values

Type of effect	Risk metric	Cut-off value (Fl. soil remed. Decree)
Threshold		
→ systemic	Highest RI_{total}	RI = 1
→ local	Highest RI (oral or inhalation)	RI = 1
Non-threshold		
→ systemic	$ExCR_{total}$ for lifetime exposure	ExCR = 1×10^{-5}
→ local	ExCR (oral or inhalation) for lifetime exposure	ExCR = 1×10^{-5}
Pseudo-threshold		
→ systemic	pRI_{total} for lifetime exposure	pRI = 1
→ local	pRI (oral or inhalation) for lifetime exposure	pRI = 1

RI = Risk Index (exposure / risk threshold)
ExCR = Excess lifelong Cancer Risk (exposure * unit risk)
pRI = pseudo-Risk Index (exposure / risk threshold)

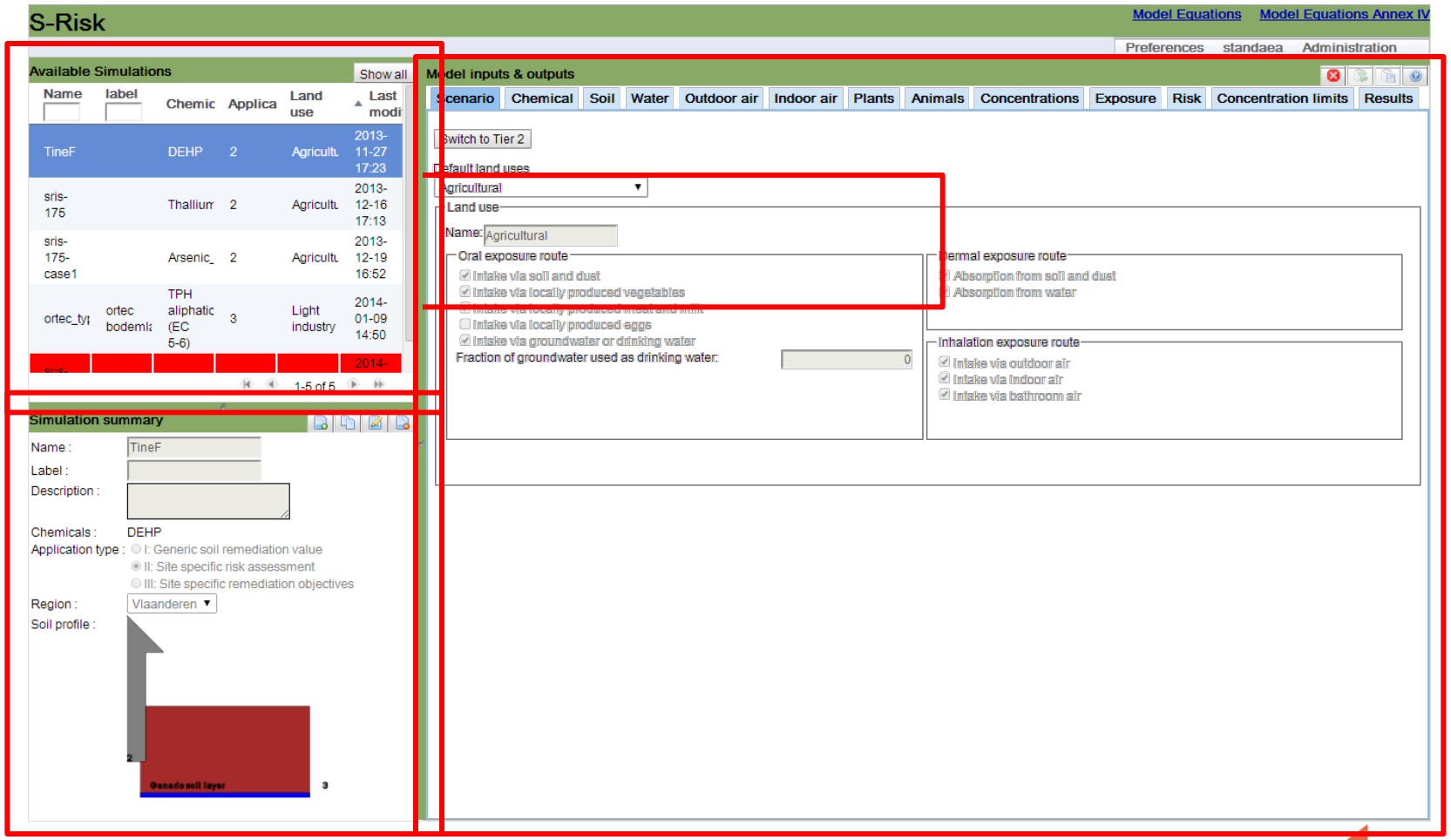
Online web platform

- S-Risk portal (https://www.s-risk.be)
  - S-Risk application
  - Information about releases & training events
  - Documentation (manual, technical guidance & data sheets)
  - Registration & demo licenses
  - Helpdesk & FAQs

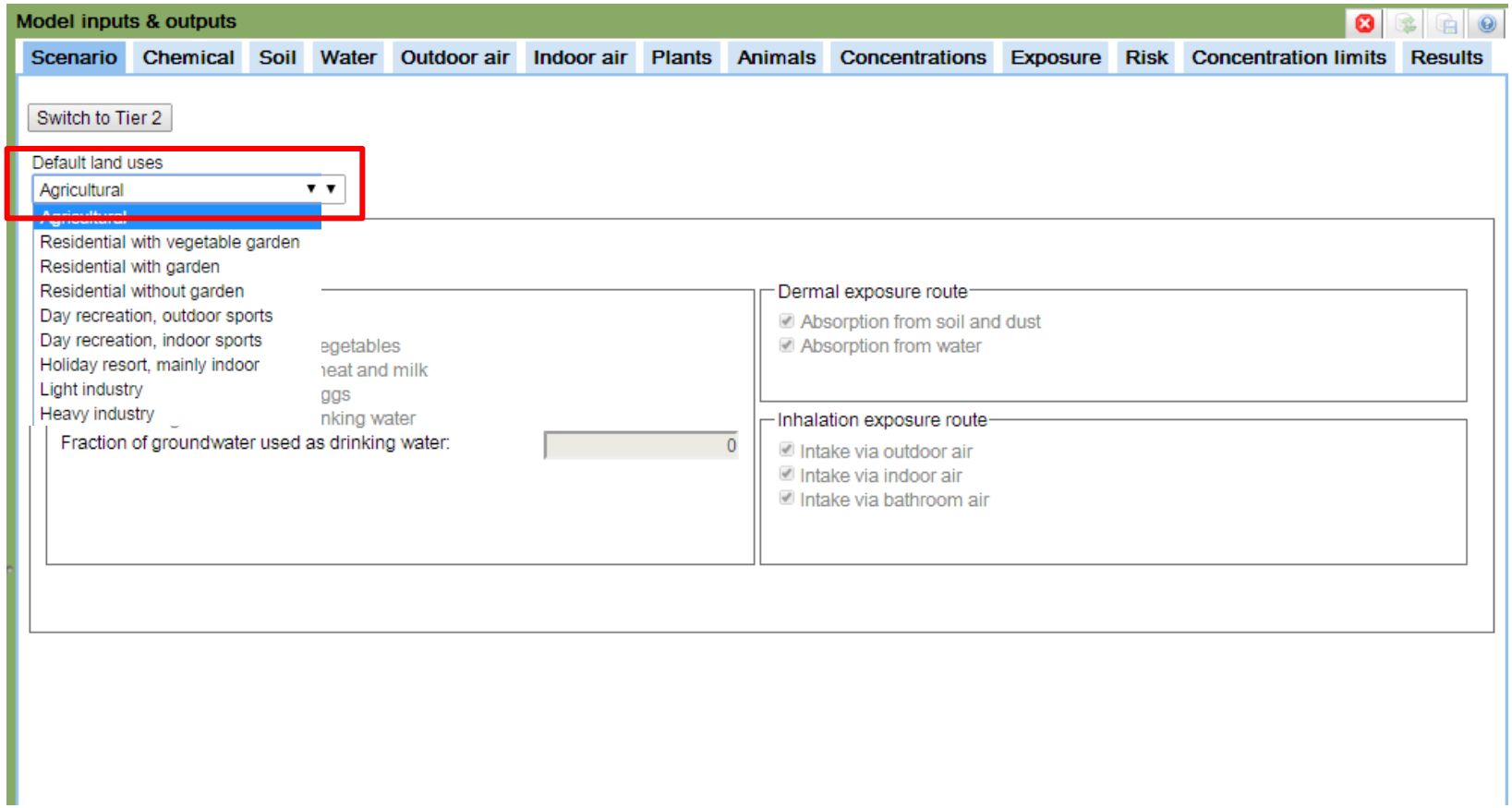


- Today
  - 65 registered users
  - > 8700 simulations

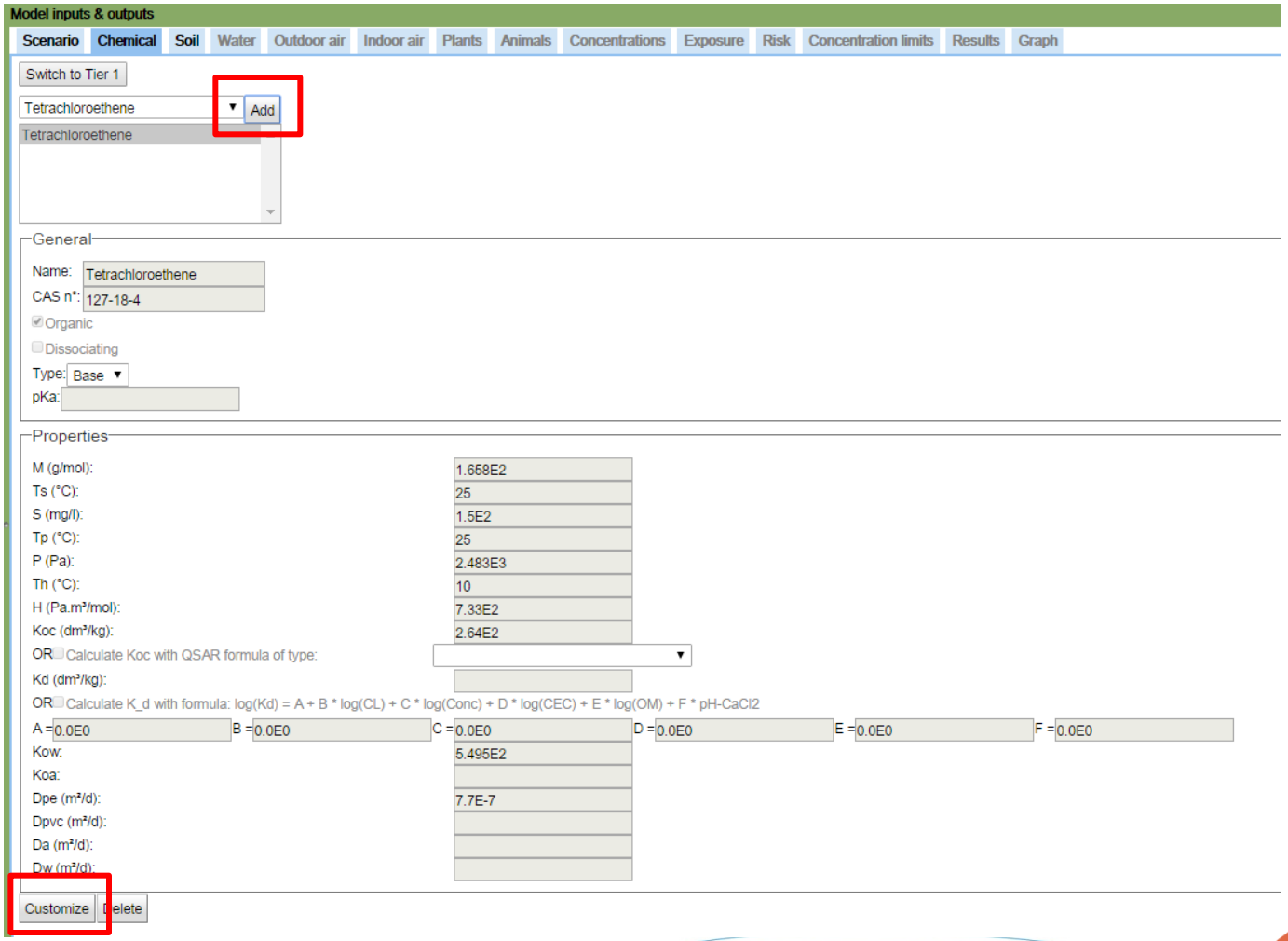
Online web platform - overview



Online web platform - scenarios



Online web platform - chemicals



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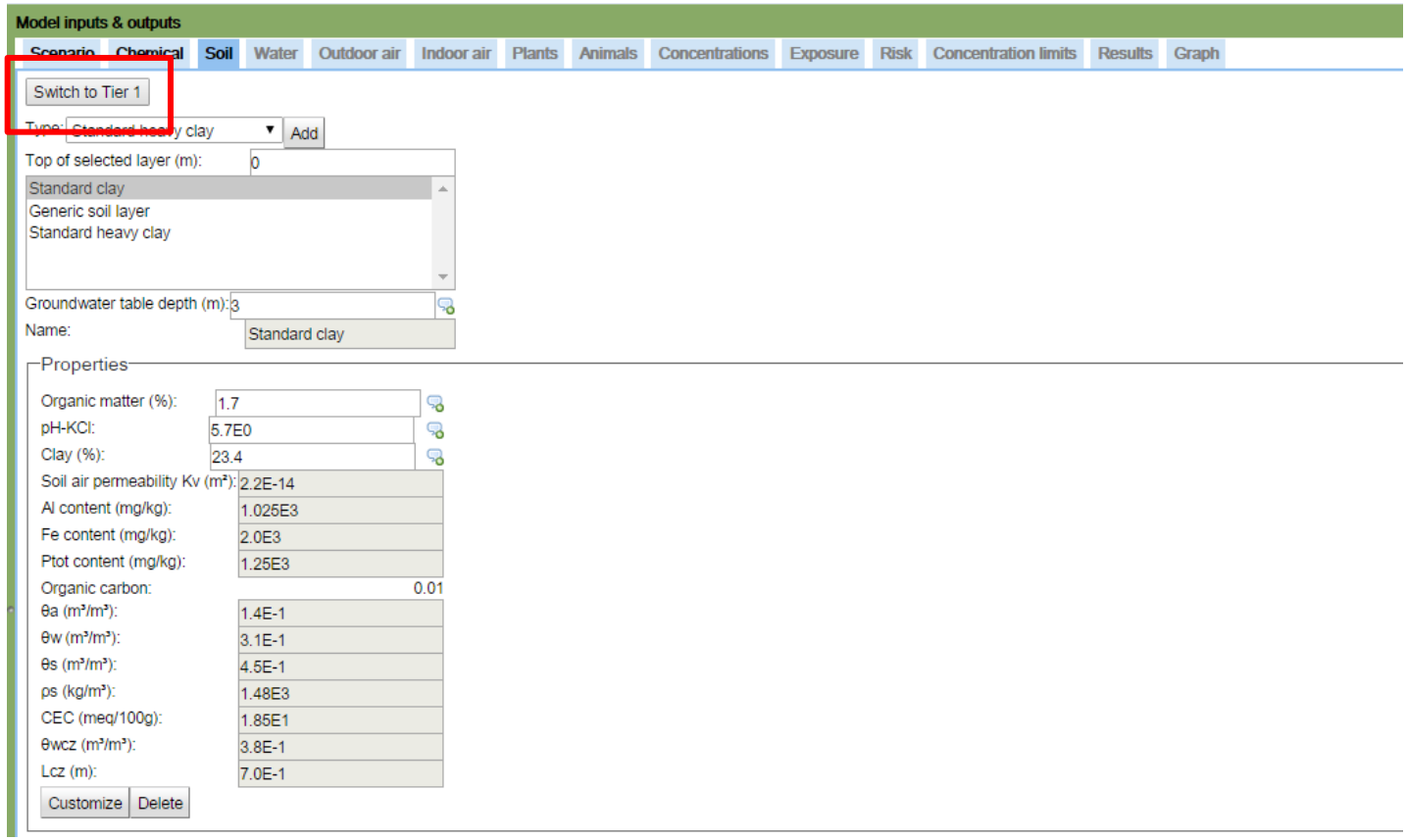
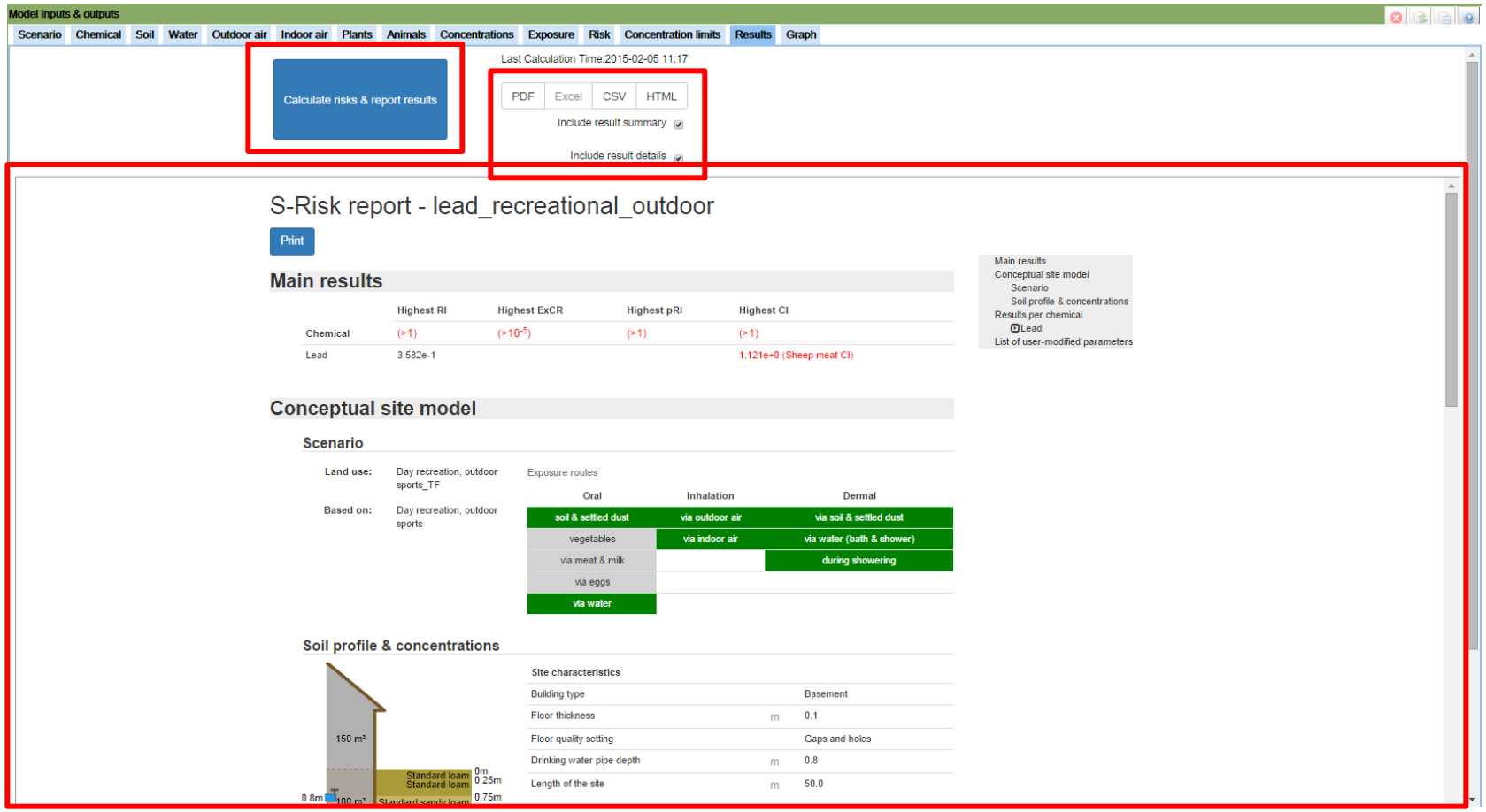
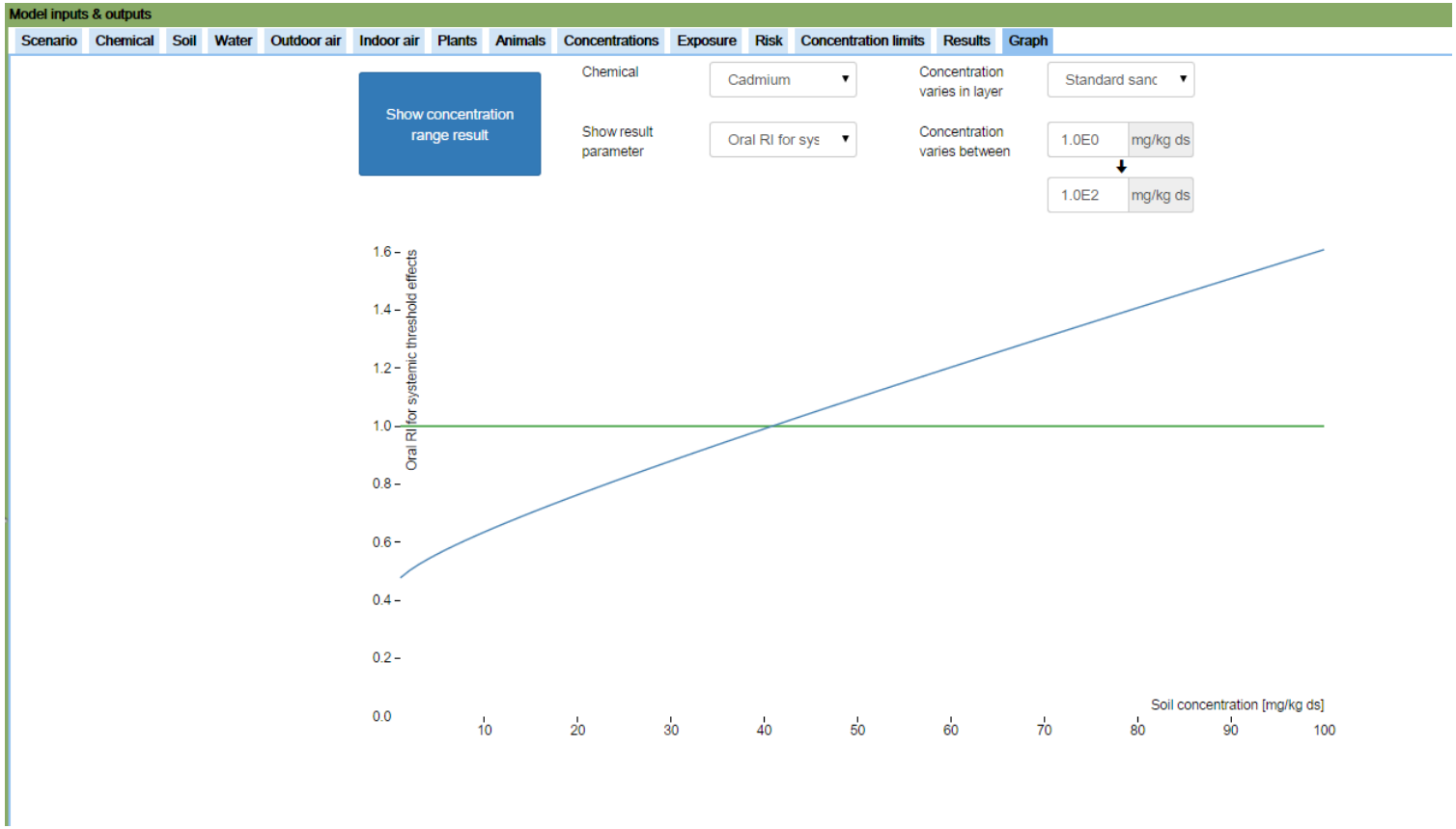
Online web platform – soil profile



Online web platform - output



Online web platform - output



Future plans

S-Risk Light

- Same concept as current S-Risk Pro version, but
  - Less modelling functionalities
  - No helpdesk support

- Will be developed upon sufficient user interest.
  Please contact us (info@s-risk.be) if you are interested.

Additional information

- Model application, documentation, etc.
  - web page: https://www.s-risk.be

- Questions, demo license requests, etc.
  - E-mail to helpdesk: info@s-risk.be
  - Talk to us:

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