



# Soil and Groundwater Contamination

An old and Emerging Environmental Issue

古くて新しい

## 土壌・地下水 汚染問題



*To solve the increasingly complex and diverse issues of soil contamination, we would like to enhance cooperation with researchers from different disciplines.*

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複雑化・多様化する土壌汚染の問題を解決するためには、分野を問わずに連携していきたいと考えています。

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## How Can We Reduce the Risk of Soil Contamination?

Soil and groundwater contamination is an old and emerging environmental problem. In the past there was a notorious pollution incident at the Ashio Copper Mine in Tochigi Prefecture, Japan, and recently the radioactive contamination resulting from the Fukushima Daiichi Nuclear Power Plant Accident has been a serious problem. With the growth of Japan's economy and industry, pollution problems have become more and more complex and diverse.

Soil and water contamination, some of which may occur together with air pollution, can seriously affect human health, animals and plants, and the environment. However, once pollution occurs, it is very difficult to totally eliminate the overall risk, regardless of the measures used.

### Practically applicable technologies

To cope with this risk, we are committed to the aggressive research and development of survey and assessment technologies; remediation and countermeasure technologies; and risk assessment and risk management technologies that are applicable to a wide range of contaminants.

Our basic research includes the development of technologies for assessing and simulating the mass transport and leaching behavior of contaminants and the development of new technologies for rapid and accurate quantification of contamination in the field. We are also promoting a variety of remediation technologies that use electrokinetics, microorganisms, natural minerals, and absorbents to enable practical application in the field. We have developed and released the Geo-Environmental Risk Assessment System (GERAS) for different kinds of contaminants. In addition, we propose that not only environmental risk but also the social and economic aspects should be considered in assessments of soil and groundwater contamination.

These technologies can be transferred to many other areas of study. We are trying to disseminate them, return the results of our research to society, and contribute to the international community as a whole.

## 土壌汚染のリスクをいかに減らしていくか

土壌・地下水汚染は、“古くて新しい環境問題”です。古くは「足尾鉬毒事件」、近年では福島第一原子力事故による放射能汚染が問題となっています。これらの汚染問題は日本の経済成長、産業の発展に伴って、多様化・複雑化してきました。

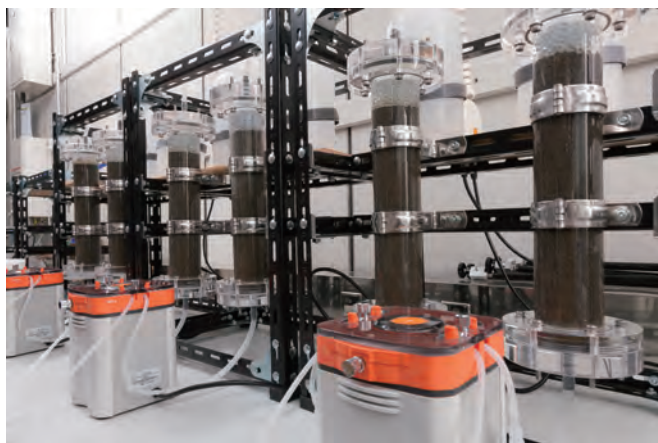
土壌および水の汚染は人の健康、動植物や生態環境に深刻な影響を与え、ときには大気汚染が関与することもあります。しかし、汚染問題が発覚した場合、いかなる対策を講じても総合的なリスクをゼロにすることは難しいと考えられています。

### 現場で使える技術を

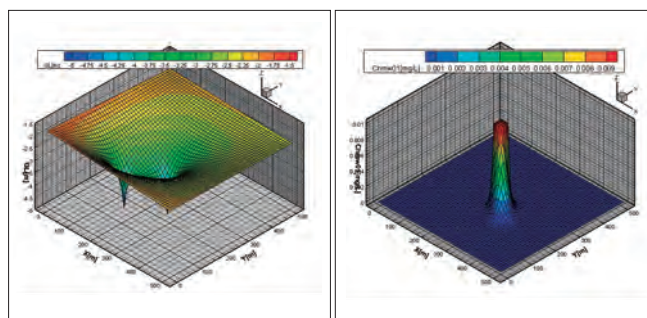
私たちは、リスクと上手に付き合うために、各種汚染物質の調査・評価技術、浄化・対策技術およびリスク評価・管理技術に関する研究開発に「挑戦的な気概を持って」取り組んでいます。

具体的には汚染物質の拡散・溶出挙動の評価・シミュレーション技術の開発、現場での汚染物質の迅速測定技術開発といった基礎研究に加え、動電学的手法、微生物、天然鉬物、吸着材等を用いた現場に即した浄化技術の開発を行っています。また、汚染物質を対象とした地圏環境リスク評価システム（GERAS）を開発・公表し、土壌・地下水汚染評価に環境リスクの概念のほか、社会・経済的側面も考慮することを提唱しつづけています。

これら開発技術は、他分野にも幅広く適用するものです。そのため、技術の普及および社会への還元、そして、国際社会への貢献も積極的に進めています。



Left: Column testing systems for characterizing the leaching and transport properties of contaminants in soils.



Changes in hydraulic head induced by pumping

Spatial distribution of a contaminant

Right: The Geo-Environmental Risk Assessment System (GERAS) is capable of simultaneous mass transport simulation and risk assessment.