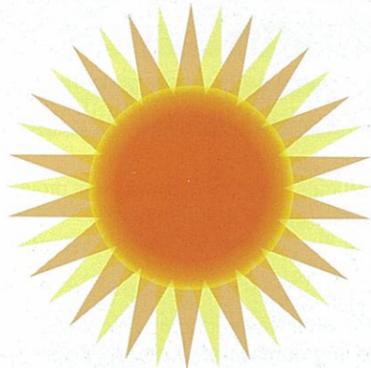
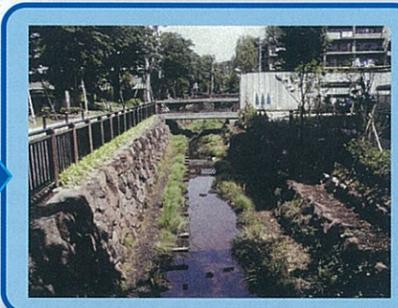
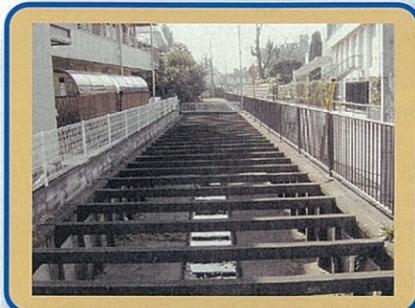


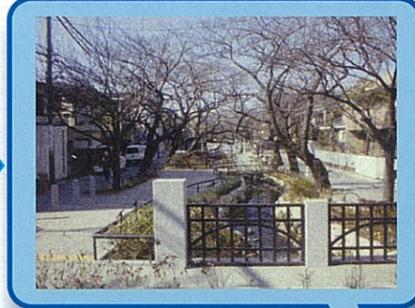
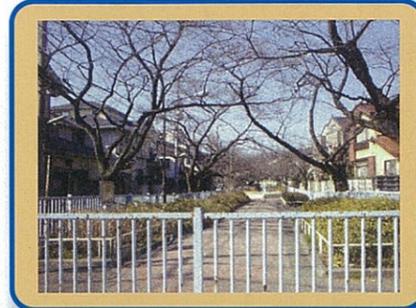
Promotion of the Mitigation of Measures of Heat Island by Using Water



Protection of banks with vegetation



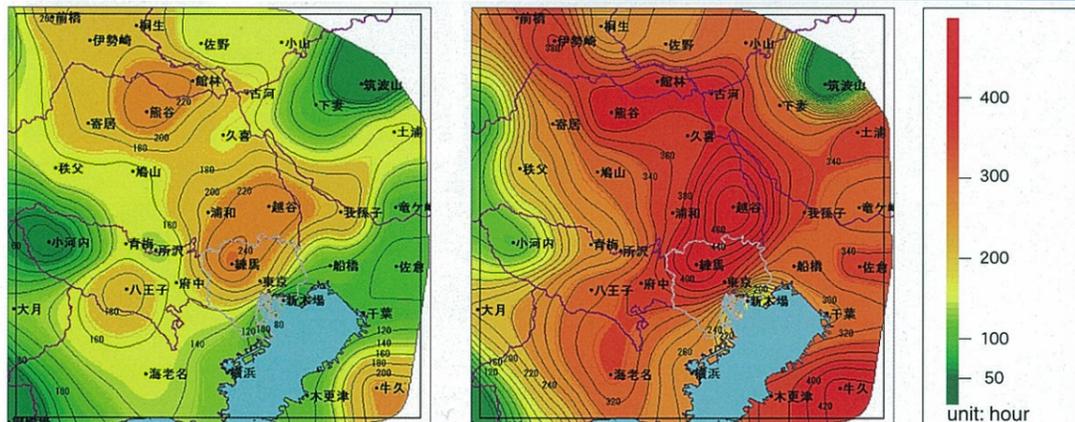
Expansion of the water surface exposed to the atmosphere



Heat Island phenomenon

Heat Island is a phenomenon where temperatures in urban areas are higher than those in suburban areas due to the exhausted heat from air conditioners, vehicles, etc. and an increase in the area of artificial surfaces such as paved roads or concrete buildings.

Increase in the total number of hours when the temperature exceeded 30 degrees Celsius in the Tokyo metropolitan area



The above isochrones maps show the total number of hours when the temperature exceeded 30 degrees Celsius in the Tokyo metropolitan area, based on AMeDAS data (Jul.-Sep., 1981 and 1999)

Outline of mitigation measures

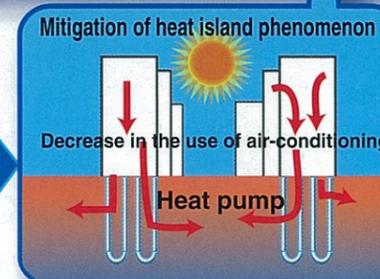
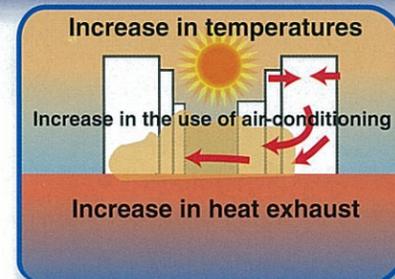
The following measures will be promoted to mitigate the Heat Island phenomenon:

- ◆ Examination of the mitigation effects of streams, waterways, etc.
- ◆ Assessment of the impact on groundwater and the ground environment when using groundwater, etc. to mitigate the Heat Island phenomenon
- ◆ Assessment of the heat impact on groundwater and the ground environment when using subterranean heat to mitigate the heat island phenomenon

Conceptual rendering of Heat Island mitigation measures using water and subterranean heat



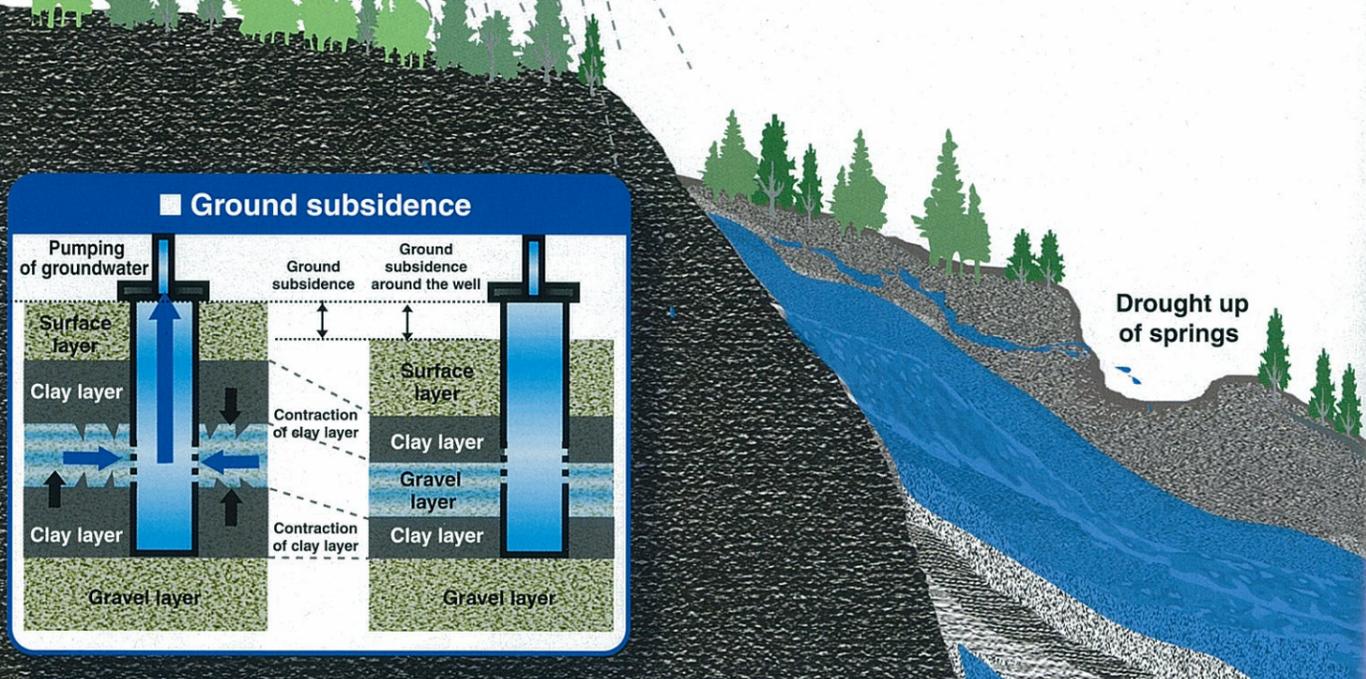
Sprinkling using groundwater, etc.



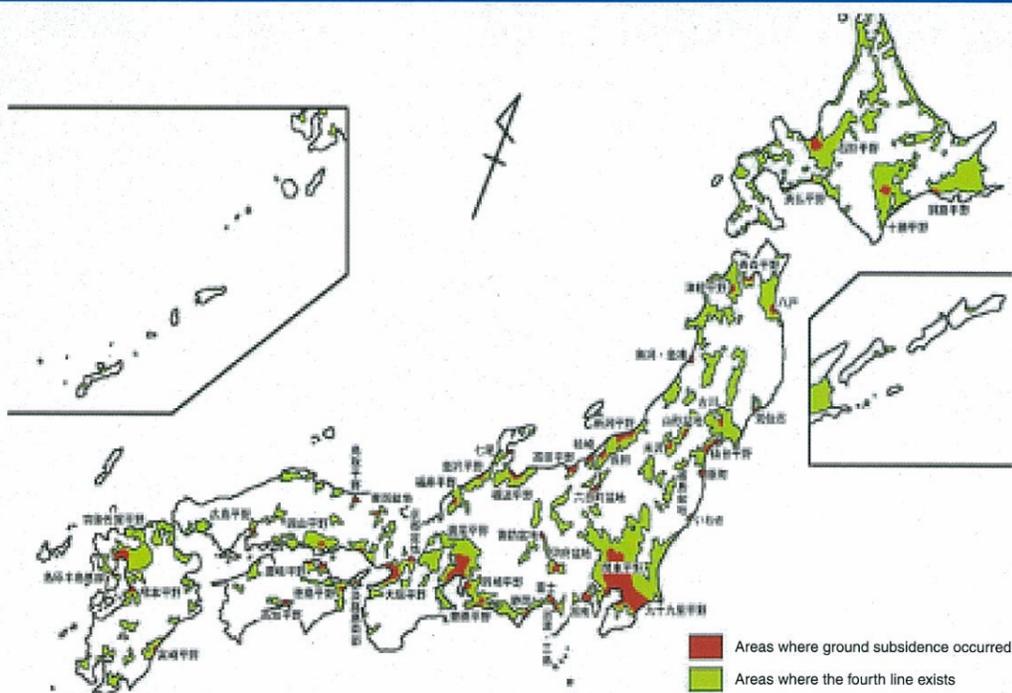
Use of subterranean heat by using heat pumps

Ground Environment Conservation

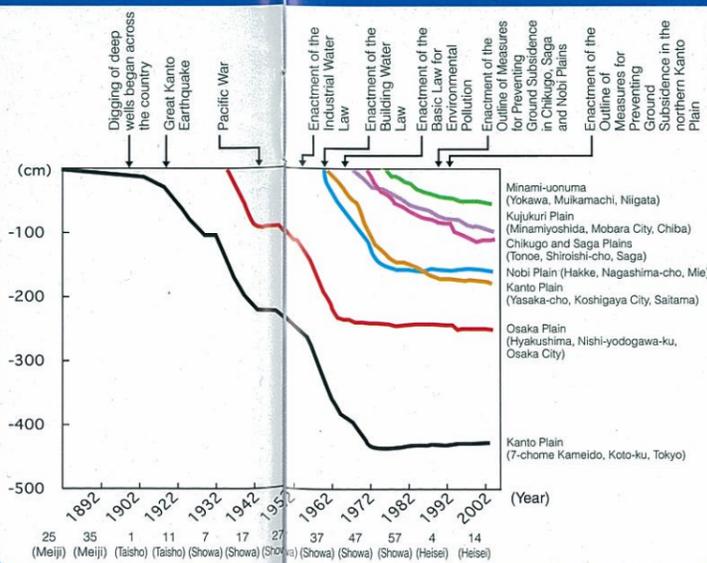
- ◆ Excessive extraction of groundwater lowers groundwater levels, resulting in the contraction of the clay layer and eventually the subsidence of the ground.
- ◆ Ground subsidence is an irreversible phenomenon.



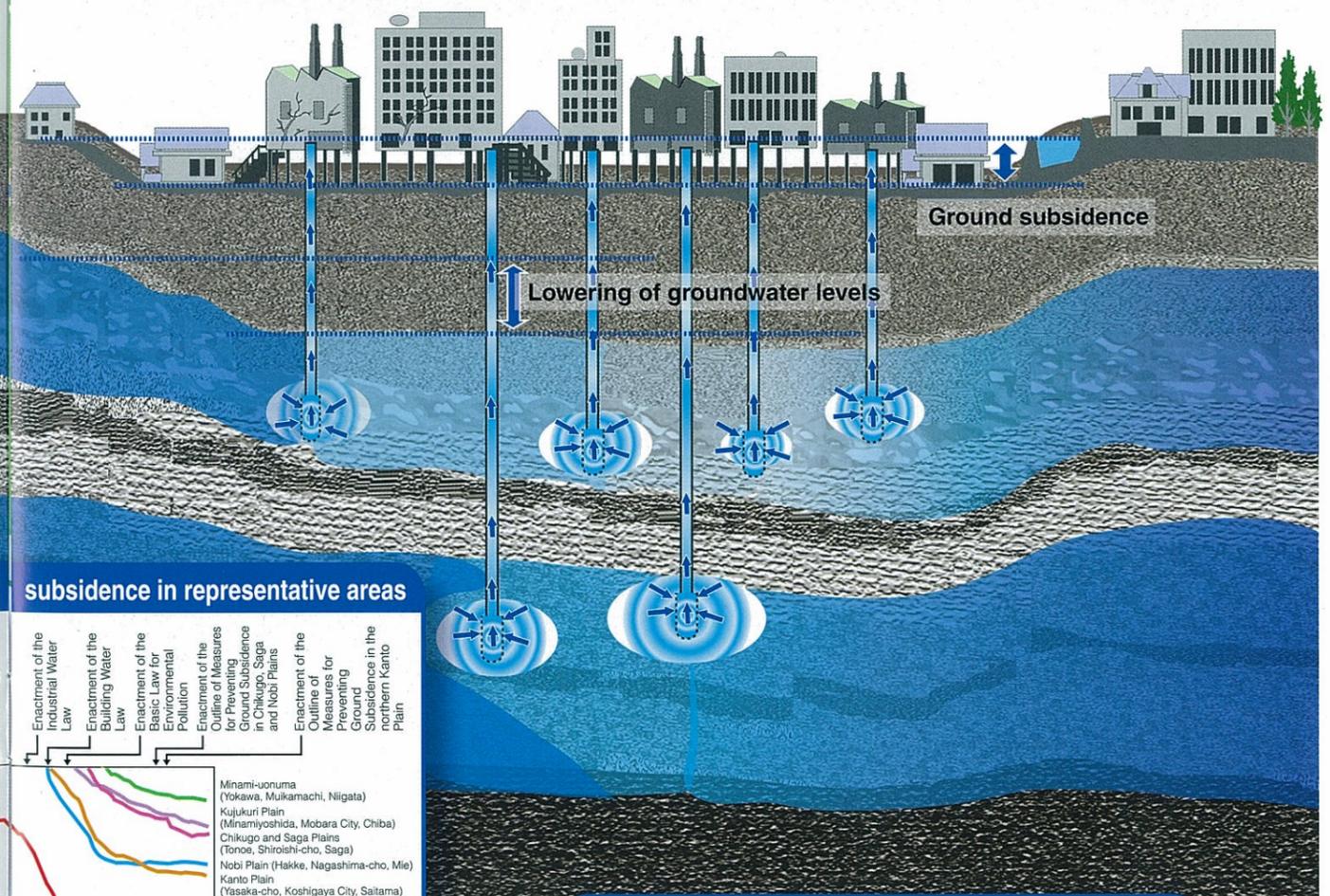
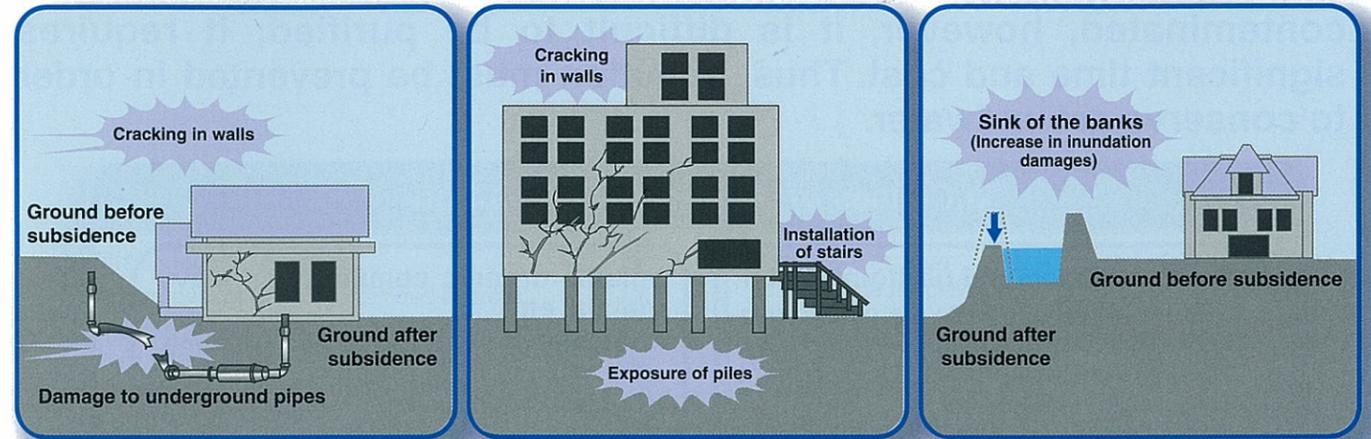
Areas affected by ground subsidence



Changes in ground subsidence in representative areas



Examples of damage due to ground subsidence



Ground subsidence prevention measures

- ◆ Regulation of excessive extraction of groundwater for industrial and domestic use
- ◆ Shift from groundwater to surface water
- ◆ Monitoring and measurement of the levels of the ground and the groundwater, etc.

Groundwater Pollution Control

Groundwater, which is quite stable in both terms of temperature and water quality, is an accessible and convenient water source. Once contaminated, however, it is difficult to be purified; it requires significant time and cost. Thus, pollution must be prevented in order to conserve groundwater.

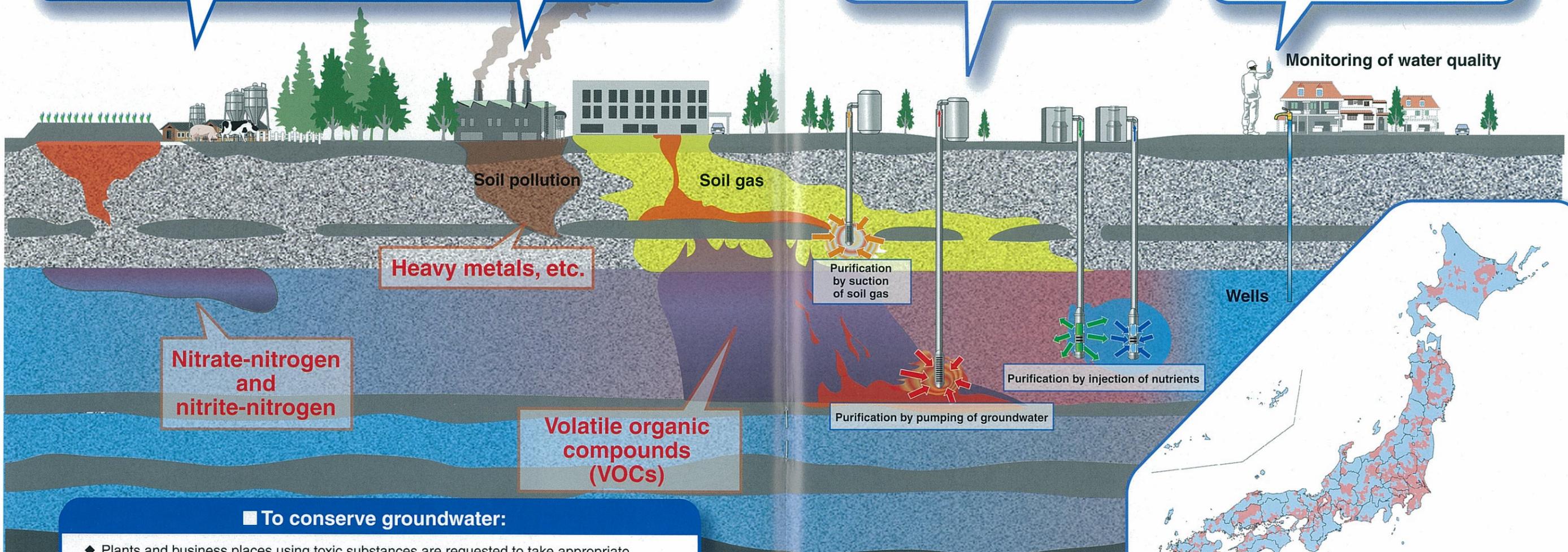
Causes of groundwater pollution

Nitrate-nitrogen and nitrite-nitrogen

Infiltration of nitrogen into the ground due to excessive application of fertilizers and improper treatment of livestock excrement and domestic wastewater

Volatile organic compounds, heavy metals, etc.

Infiltration of VOCs (tetrachloroethylene, etc.) and heavy metals (lead, etc.) into the ground from plants, business places, etc.)



Groundwater purification

Typical techniques are:

- ◆ Removal of toxic substances by land excavation or suction of contaminated water
- ◆ Pumping of groundwater, followed by separation of toxic substances
- ◆ Underground decomposition of toxic substances in groundwater

Monitoring of groundwater quality

Local governments conduct the following surveys, the results of which are made public.

- ◆ Measurement of the quality of groundwater
- ◆ Identification of the scope of groundwater pollution
- ◆ Continuous monitoring of polluted wells

Monitoring of water quality

To conserve groundwater:

- ◆ Plants and business places using toxic substances are requested to take appropriate measures to prevent them from infiltrating into the ground.
- ◆ Do not apply excessive amounts of fertilizers.
- ◆ Treat livestock excrement properly
- ◆ Those who use groundwater are requested to inspect its quality for safety purposes

Status of groundwater pollution in Japan

Municipalities where one or more wells that did not meet environmental standards were found between 1997 and 2004