

Know about urban disasters

Know the characteristics of "guerilla downpours" (cloudbursts)

Cloudbursts, or guerilla downpours as they are called, can expose anyone to danger in unexpected areas. Caution is needed against sudden increases in river water levels.

Photo source / Kobe City

The water level rose approximately 1m 30cm in just 10 minutes!

On July 28, 2008, localized heavy rains led to a sudden increase in the water level of the Toga River in Nada-ku, Kobe. Children playing in Shimizu Park, which is located on the river, were swept away and unfortunately, 5 of them were killed.

A guerilla-like rain that attacks suddenly

In recent years, there have been many accidents caused by localized and concentrated heavy downpours, where strong downpours occur in a very localized area in a short period of time. Because these rains are hard to predict, they are called "guerilla downpours." Guerilla downpours are characterized by cumulonimbus clouds form and become more active when the atmosphere is unstable, causing localized heavy rain in a short period of time (localized downpours). There are also cases where multiple cumulonimbus clouds form and develop over the same area, causing rain to fall in the same area over a span of hours (concentrated downpours).

Characteristic water related disasters resulting from guerilla downpours include flooding of rivers, sudden increases in water level, and flooding of low-lying areas. In 2008, guerilla downpours occurred over Shimizu Park in the Toga River in Kobe City and in a sewer construction site in Zoshigaya, Tokyo. The sudden increases in water level have also led to fatal accidents. At the current time, it is difficult to predict these unique heavy downpours using current weather forecast technology. Be sure to take thorough precautions when going near rivers by checking to see that there are no risks of localized rain by checking the water forecast.

Fully utilize

the Meteorological Agency website

The Meteorological Agency website has various forecasts that may assist in predicting guerilla downpours. The "Rainfall Nowcast" predicts rainfall amount distribution for every 10-minute period for the next hour. Try and fully utilize this information.

<http://www.jma.go.jp/jp/radnowc/>

Protect yourself from guerilla downpours

- If the sky turns dark or if you see or hear thunder or lightning, take refuge in a building.
- Be cautious when cold winds start blowing.
- Take refuge in a building when large drops of rain or hail start falling.
- Evacuate immediately if the water level of the river increases or the water becomes cloudy.
- If you are in a low-lying area on a rainy day, move to higher ground.
- Evacuate immediately if you hear warning sirens.

*Sandbag distribution available (Wastewater Management Section, Wastewater Department)

Location	Risks
Underground facilities (underground shopping districts, etc.)	Flood water flowing in from rivers.
Residences (basements, basement garages)	Water overflowing from rivers and gutters flowing in with a possibility of becoming submerged.
Roads (pedestrians, bicycles)	Roads become flooded, making the divide between the road and sidewalk difficult to see, causing trips and falls.
Roads (cars)	Driving into flooded areas may cause movement impossible, with a possibility of becoming submerged.
Riverbanks, sandbanks in a river (recreation, fishing)	Being swept away by the sudden increase in water, or becoming stranded at a sandbank in a river.
Sewer pipes, irrigation canals	Being swept away by the sudden increase in water.
Mountain climbing	Being swept away by the sudden increase in water of mountain streams.

If you have even the slightest suspicion, take immediate action!



Response when disasters occur

It's dangerous in the basement!

There are many underground or basement facilities in the city such as department store basement supermarkets, underground shopping districts and subways. However, they are all areas with limited entrances and exists, with high rates of enclosure. Once a disaster occurs, it can easily spread making evacuation and rescue difficult.

In addition, in underground areas, there is also another risk of not being aware of disasters that may be occurring above ground.

In fact, there have been incidents where underground facilities and building basements being flooded due to heavy downpours and causing the deaths of people who could not escape in time. Movement underground is more restricted and therefore more caution is needed towards disasters.



Risks of wind and water damage

- **Water suddenly rushes into basements.** In the event of heavy rains or flooding, there is a high risk of water rushing into basement spaces in a very short period of time.
- **Doors cannot be opened because of water pressure.** Water pressure caused by flooding is unexpectedly high, making doors impossible to open.
- **Blackout of the entire building.** Depending on the basement facility, the entire building may lose power and communications with the outside may be lost.

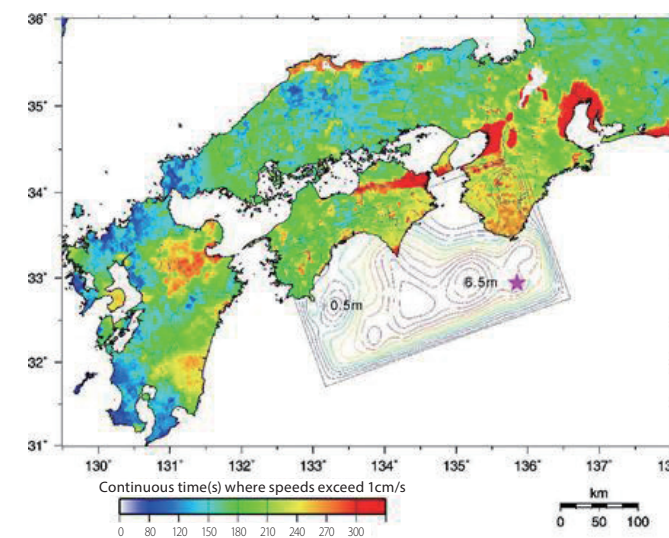
Evacuation points

- **Check the hazard map**
Use the hazard map to know your evacuation areas in advance, in the event of heavy rains and flooding.
- **Check the weather forecast**
Check the weather forecast daily and avoid the use of underground facilities during heavy rains and floods if possible.

High-rise buildings are dangerous (long period ground motion)

● The third type of seismic wave

People often only think of P and S waves when it comes to seismic waves. However, another, third type of seismic wave is gaining attention. This is long period ground motion. The event that brought this to light was the Tokachi-oki earthquake in 2003. The shaking caused numerous oil tanks in and around Tomakomai City to be damaged. The characteristic of this wave, is of course, the long shaking. Regular shaking has a cycle (the time it takes for one complete shaking movement back and forth) of about 0.5 to 2 seconds while long period ground motion has a cycle of a few seconds to tens of seconds, and shakes or moves slowly. In addition, other characteristics include the facts that these waves travel long distances and shake large structures.



*What are P and S waves?	P waves: Vertical waves during an earthquake that arrive first.
	S waves: Horizontal waves that arrive after the P waves.

● Be prepared for seismic waves

What actually happens when these seismic waves reach a high-rise condominium? Just because the shaking is slow doesn't mean you can relax. Heavy objects such as chests of drawers and pianos gradually start moving, and can "attack" residents as their movements grow larger. Moreover, only some tall buildings in some cities have experienced long period earthquakes in the past, and hence in many cases the specific countermeasures to be taken are not known. What we can do now is to firmly secure furniture in preparation for these seismic waves, and to always be prepared.

In 2012, the government's Headquarters for Earthquake Research Promotion created this draft of the Prediction Map of Long Period Ground Motion from the Nankai Earthquake. It is predicted that areas in red, such as Osaka, will face sustained periods of shaking.

