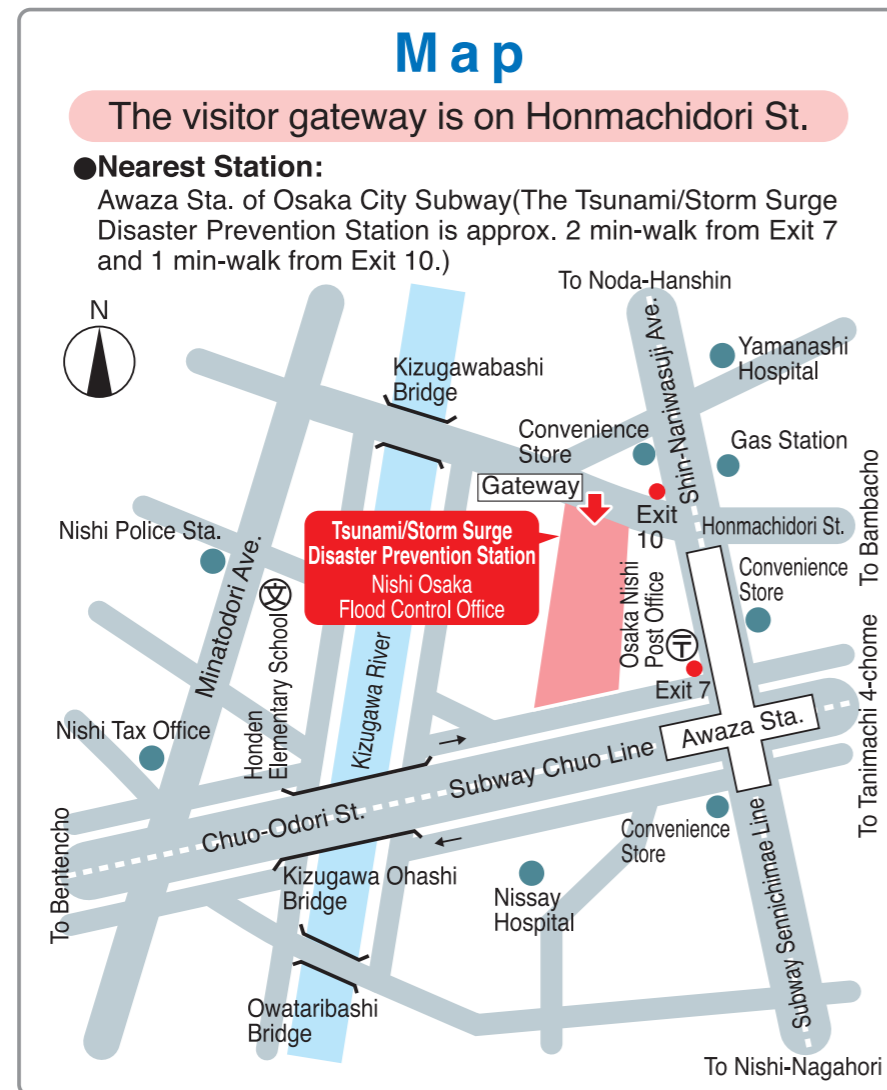


Tsunami/Storm Surge Disaster Prevention Station

Guidebook



2-1-64 Enokojima, Nishi-ku, Osaka 550-0006

Tel: 06-6541-7799

Website (in Japanese):

<http://www.pref.osaka.jp/nishiosaka/tsunami/index.html>

Hours: 10 a.m. - 4. p.m.

Closed: Tuesday (if a Tuesday falls on a national holiday, closed on the following weekday), plus year-end and New Year holidays

Admission: free

Access: approx. 2 min-walk from Exit 7 and 1 min-walk from Exit 10 of Osaka City Subway Awaza Sta. (Chuo Line and Sennichimae Line)

*Please use public transportation.

*No smoking is allowed on the premises. No food or drinks are allowed inside the building.



Osaka below Sea Level

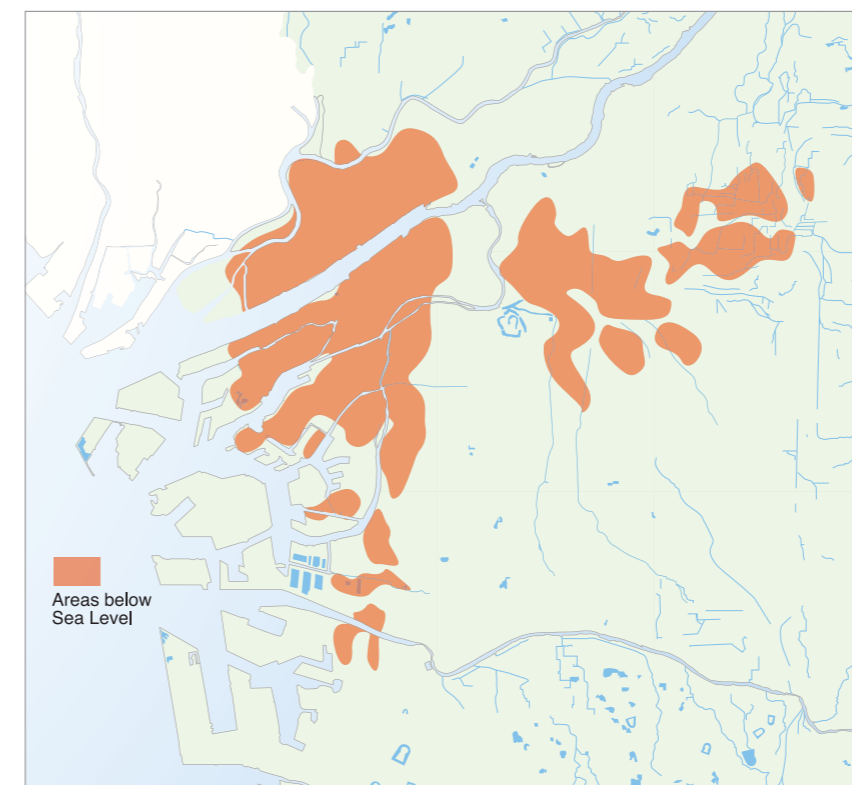
Our City Is below Sea Level

A city below sea level, Osaka has been often inflicted by tsunami and tidal surge disasters.

Take a look at our city below sea level!
Imagine how terrifying it would be to be swamped by seawater!



This model exhibition section, with the floor regarded as sea level, enables you to keenly realize that Osaka is a city below sea level with potential risks. Integrated use of film, sound and illumination stirs your imagination on what would happen when a typhoon hits the city.



Areas below Sea Level

Areas below sea level are land areas whose surface is lower than the average sea level at high tide.

In Osaka, at the beginning of the Showa period a large volume of underground water was pumped up for industrial use, causing serious problems such as subsidence. In Osaka Prefecture, there are approximately 40 km² of areas below sea level, home to approximately 1.08 million people.

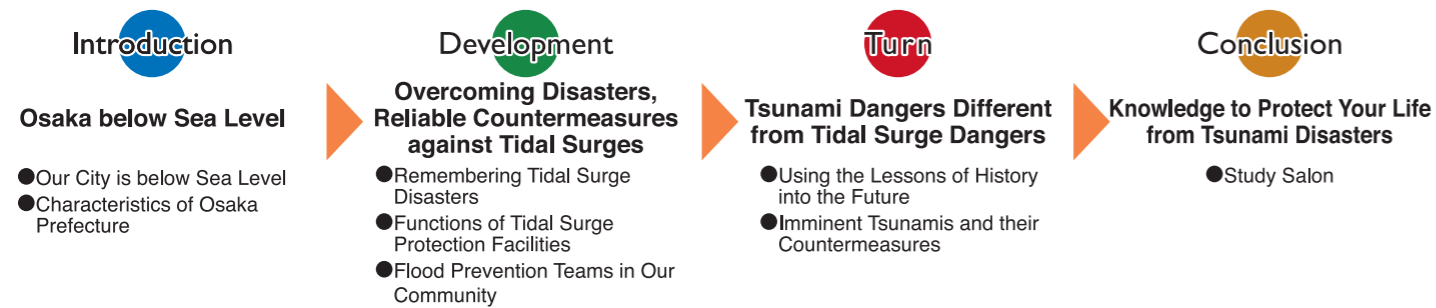
Using a model of Osaka Prefecture, a film offers a visible explanation on the prefecture's characteristics, where people and properties are concentrated in coastal areas below sea level.

What Is the Tsunami/Storm Surge Disaster Prevention Station?

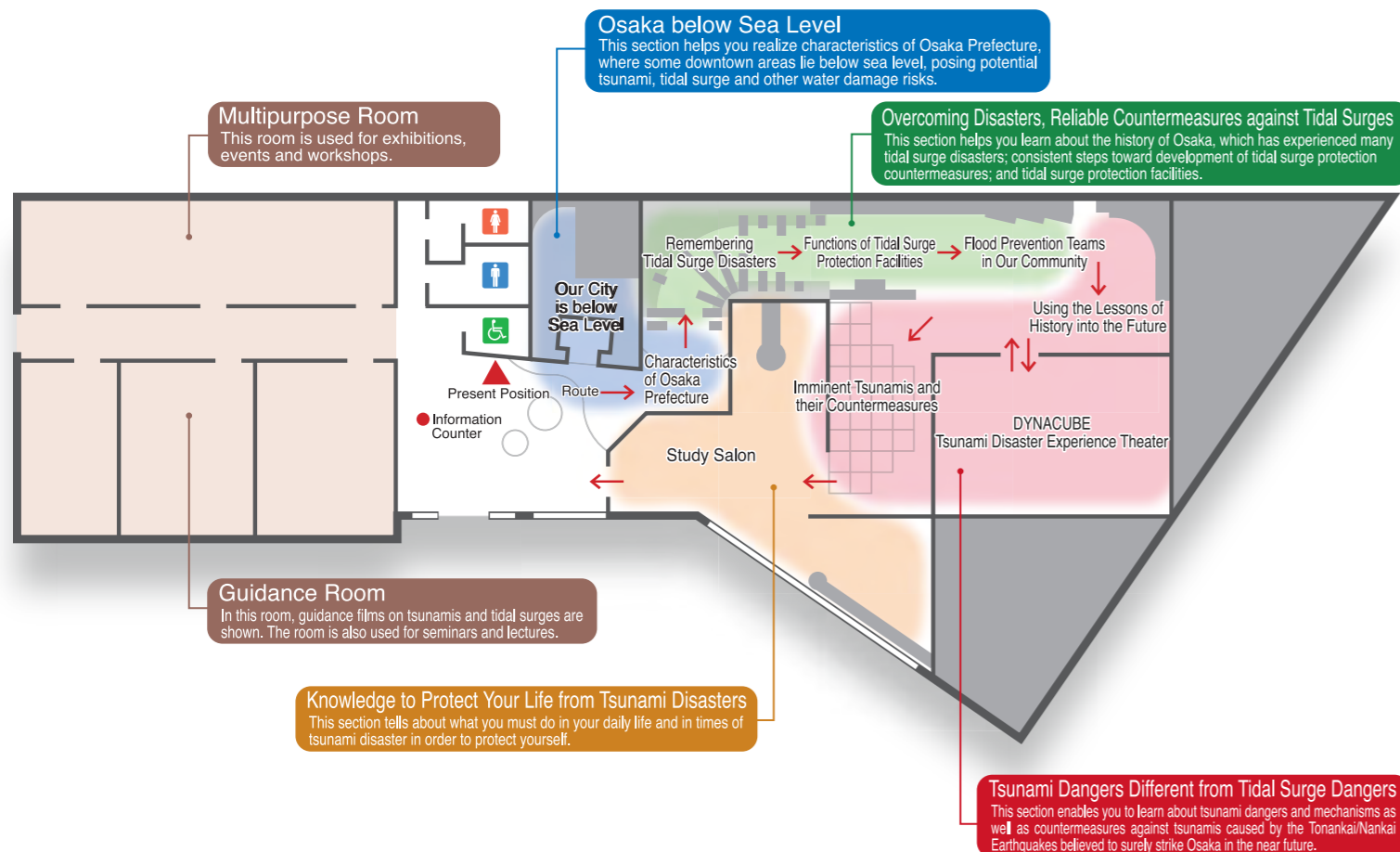
The Tsunami/Storm Surge Disaster Prevention Station comprises the Disaster Prevention Building and Display Building. The former building provides collective control for tsunami and tidal surge protection facilities, such as seawalls and gates, administered by the Nishi Osaka Flood Control Office. The latter building seeks to enhance awareness of disaster prevention among Osaka residents.

The Display Building, open to the public, helps visitors gain correct knowledge of tidal surges that have struck Osaka in the past, as well as of the Tonankai/Nankai Earthquakes and tsunamis believed to surely hit Osaka in the near future. The building also enables you to learn about how to react when an earthquake or tsunami occurs.

By "looking, listening and touching," you can enjoy learning, and realize the importance of preparing for disasters.

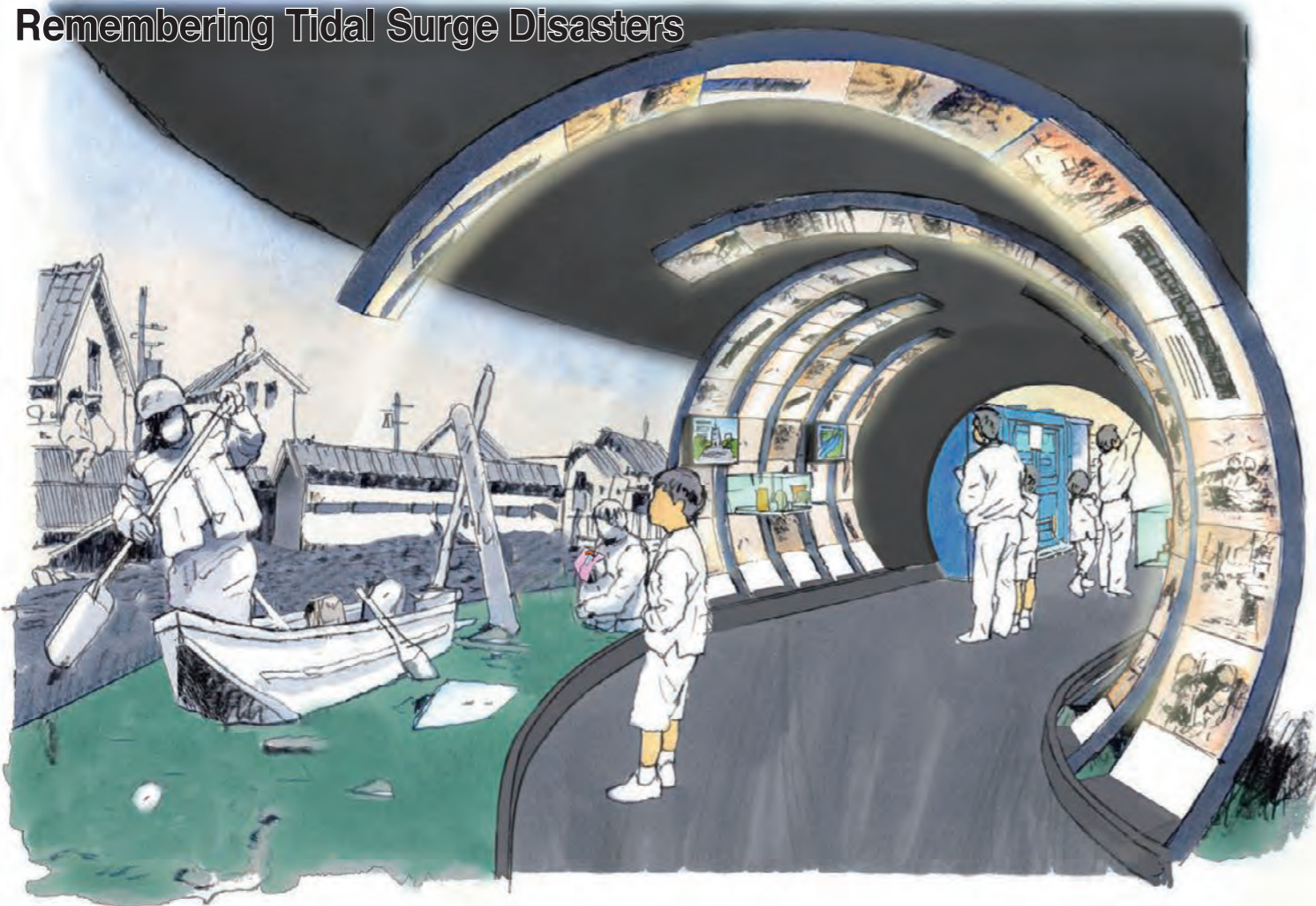


Floor Map



Overcoming Disasters, Reliable Countermeasures against Tidal Surges

Remembering Tidal Surge Disasters



The Tidal Surge Disaster Tunnel provides information on Osaka's three largest typhoons to date. Displayed in the tunnel are typhoon pictures and news films, as well as a diorama of a submerged city. The tunnel is a symbolic space allowing you to feel as if you were lost in a disaster area, stirring up anxieties.

Muroto Typhoon, September 21, 1934



In front of Osaka Station, Kita-ku
Overflow of water into the area around Osaka Station formed a considerable current, seriously damaging transportation systems.

Damage in Osaka Prefecture	Deaths and injuries: 17,898 Submerged Houses: 166,720 Submerged Areas (ha): 4,921
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Typhoon Scale	Min. Atmospheric Pressure (hPa): 912 Total Rainfall (mm): 22.3 Maximum Wind Speed (m/sec): 42.0 Tidal Level (estimated): O.P. + 4.20 m
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Jane Typhoon, September 3, 1950



Around Chikko, Minato-ku
Tidal surges were imminent; there was no time left to lose. Fire department staffers continued rescue efforts in what was a very urgent situation.

Damage in Osaka Prefecture	Deaths and injuries: 21,465 Submerged Houses: 80,464 Submerged Areas (ha): 5,625
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Typhoon Scale	Min. Atmospheric Pressure (hPa): 963 Total Rainfall (mm): 64.7 Maximum Wind Speed (m/sec): 28.1 Tidal Level (estimated): O.P. + 3.85 m
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Second Muroto Typhoon, September 16, 1961



Dojimagawa River, Kita-ku
One hour after arrival of tidal surges, the area around Watanabebashi Bridge was totally submerged, turning the street into a raging river.

Damage in Osaka Prefecture	Deaths and injuries: 2,165 Submerged Houses: 126,980 Submerged Areas (ha): 3,100
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Typhoon Scale	Min. Atmospheric Pressure (hPa): 918 Total Rainfall (mm): 42.8 Maximum Wind Speed (m/sec): 33.3 Tidal Level (estimated): O.P. + 4.12 m
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Functions of Tidal Surge Protection Facilities



Shirinashigawa River Tidal Gate

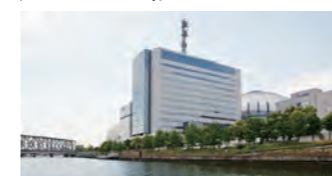
Tide Gate
Tatekawa River Tide Gate
(Sakai-ku, Sakai City)



Coastal Improvement
Around Hamadera Park
(Nishi-ku, Sakai City, and Takaiishi City)



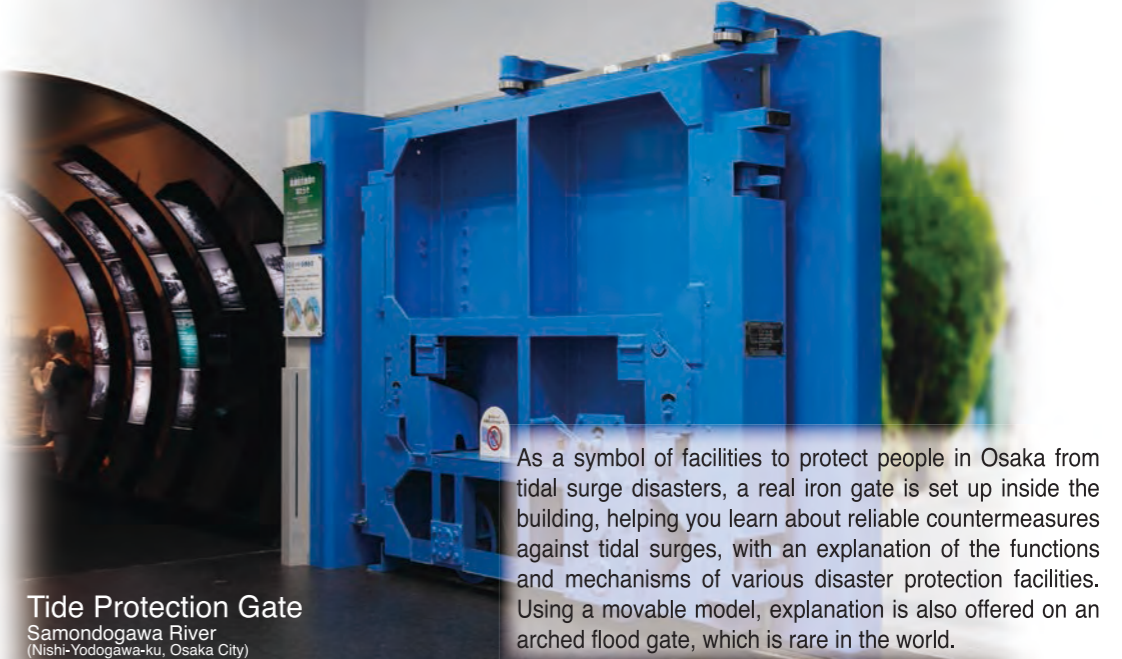
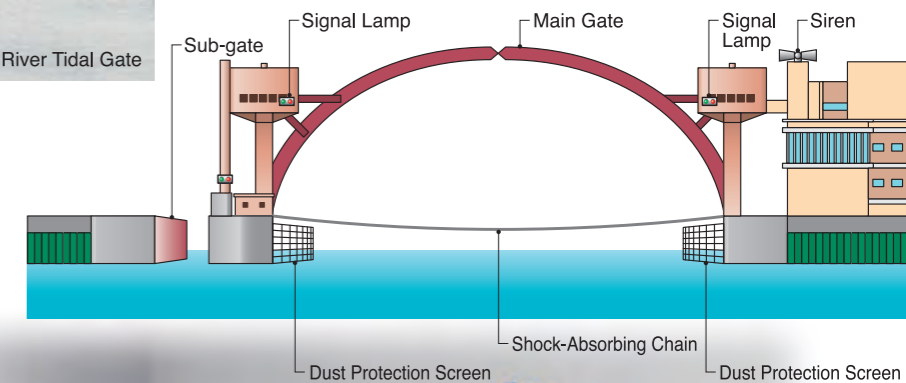
Super Levee
Around Kyocera Dome Osaka
(Nishi-ku, Osaka City)



Drainage Pump Station
Hachikengawa River Drainage Pump Station
(Izumi-Otsu City)



Tide Protection Gate
Samondogawa River
(Nishi-Yodogawa-ku, Osaka City)



As a symbol of facilities to protect people in Osaka from tidal surge disasters, a real iron gate is set up inside the building, helping you learn about reliable countermeasures against tidal surges, with an explanation of the functions and mechanisms of various disaster protection facilities. Using a movable model, explanation is also offered on an arched flood gate, which is rare in the world.



Tide Protection Seawall



Flood Prevention Teams in Our Community

Who shuts the tide protection gates when there's a threat that our city might be flooded in a typhoon or other disaster? Most such gates are actually shut by flood prevention teams. To deal with such emergencies, flood prevention teams work very hard to protect you and your daily life.



Tsunami Dangers Different from Tidal Surge Dangers

Using the Lessons of History into the Future

Tidal surges and tsunamis are quite different in terms of how they occur, their cycles and characteristics. While it's possible to predict in advance the occurrence of tidal surges, it is impossible to make detailed predictions of tsunamis. Large tsunamis often strike disastrously when people forget how terrifying previous disasters were. Let's learn from our forerunners who experienced large scale tsunami disasters, and use their lessons into the future.

Summary of Monument Description

A large earthquake occurred, devastating structures and causing fires. When the disaster began to subside, a large tsunami swamped the area, generating a backward flow approximately 1.2 m of deep muddy water toward Higashibori. All the bridges on the Ajigawa and Kizugawa Rivers were washed away. Ships were wrecked, generating mountains of ship debris along the rivers. Believing it would be safe to stay on the water during an earthquake, some people evacuated to boats or small huts built on riversides. The tsunami, however, claimed the lives of these people. At the time of the Hoei Big Earthquake, it was said that a tsunami had claimed the lives of many people who had escaped to boats. But few people knew about the tragedy, once again causing the loss of many lives. This monument seeks to let future generations know of the tragedy, with the hope that the monument's inscription continues to be well-marked to ensure it can always be clearly read.



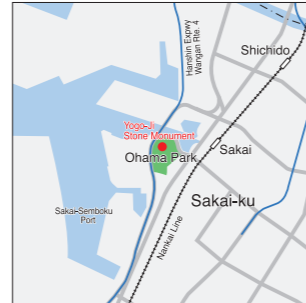
O-Jishin Ryokawaguchi Tsunami-Ki Stone Monument

This monument is erected at the foot of the Taishobashi Bridge in Naniwa-ku, Osaka City. Built in 1855, the year after the Ansei-Nankai Earthquake, the monument memorializes the public sorrow over the loss of many lives due to a failure to use the lessons from the Hoei-Nankai Earthquake 148 years before. The monument also tells about the importance of using such lessons.



Yogo-Ji Stone Monument

This is a stone monument erected on Mt. Sotetsuyama in Ohama Park, Sakai City. The monument says that, because people were well-informed of the tragic Hoei-Nankai Earthquake, they were able to escape to shrine precincts, causing no deaths or injuries. This outcome, quite different from that in Osaka, indicates the importance of learning from history.



Summary of Monument Description

A strong earthquake lasted two days. A tsunami suddenly struck the area, releasing ships berthed along riversides, shaking and destroying them. Eight bridges were also washed away. The earthquake and tsunami devastated homes and warehouses. The fear was utterly beyond description. Nevertheless, since people already knew that many had died in the Hoei Earthquake and Tsunami as a result of evacuating to boats, they evacuated to wide shrine precincts, causing no injuries. In other places around seashores and riversides, many people died after evacuating to rivers by boat; such boats were hit with large ships that had been washed away by the tsunami. Never evacuate to rivers or boats during a strong earthquake. It is important to be aware that a strong earthquake is often followed by a tsunami.

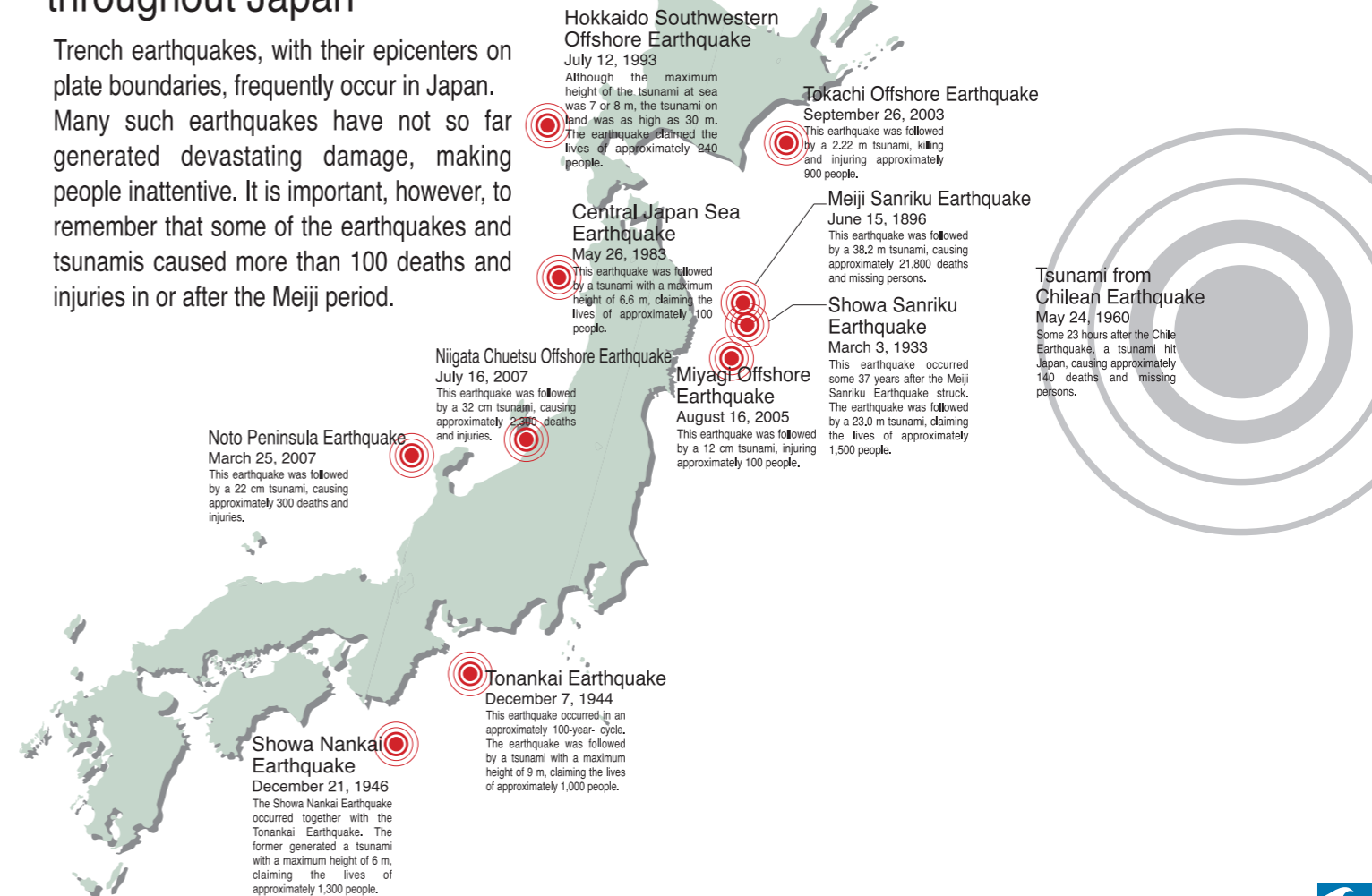
Earthquakes and Tsunamis throughout the World

Earthquakes occur almost every day somewhere in the world, causing large tsunami disasters. Past large tsunamis generated in the Pacific Ocean and Indian Ocean devastated not only the epicenters but also many coastal countries located far from the centers.



Earthquakes and Tsunamis throughout Japan

Trench earthquakes, with their epicenters on plate boundaries, frequently occur in Japan. Many such earthquakes have not so far generated devastating damage, making people inattentive. It is important, however, to remember that some of the earthquakes and tsunamis caused more than 100 deaths and injuries in or after the Meiji period.



DYNACUBE - Tsunami Disaster Experience Theater

An earthquake off the Kii Peninsula! Tsunami Warning!
Osaka swamped in a muddy, rushing current!
The use of special effects and CG makes you feel as if you're in a worst-case scenario.
What would you do in such a situation?

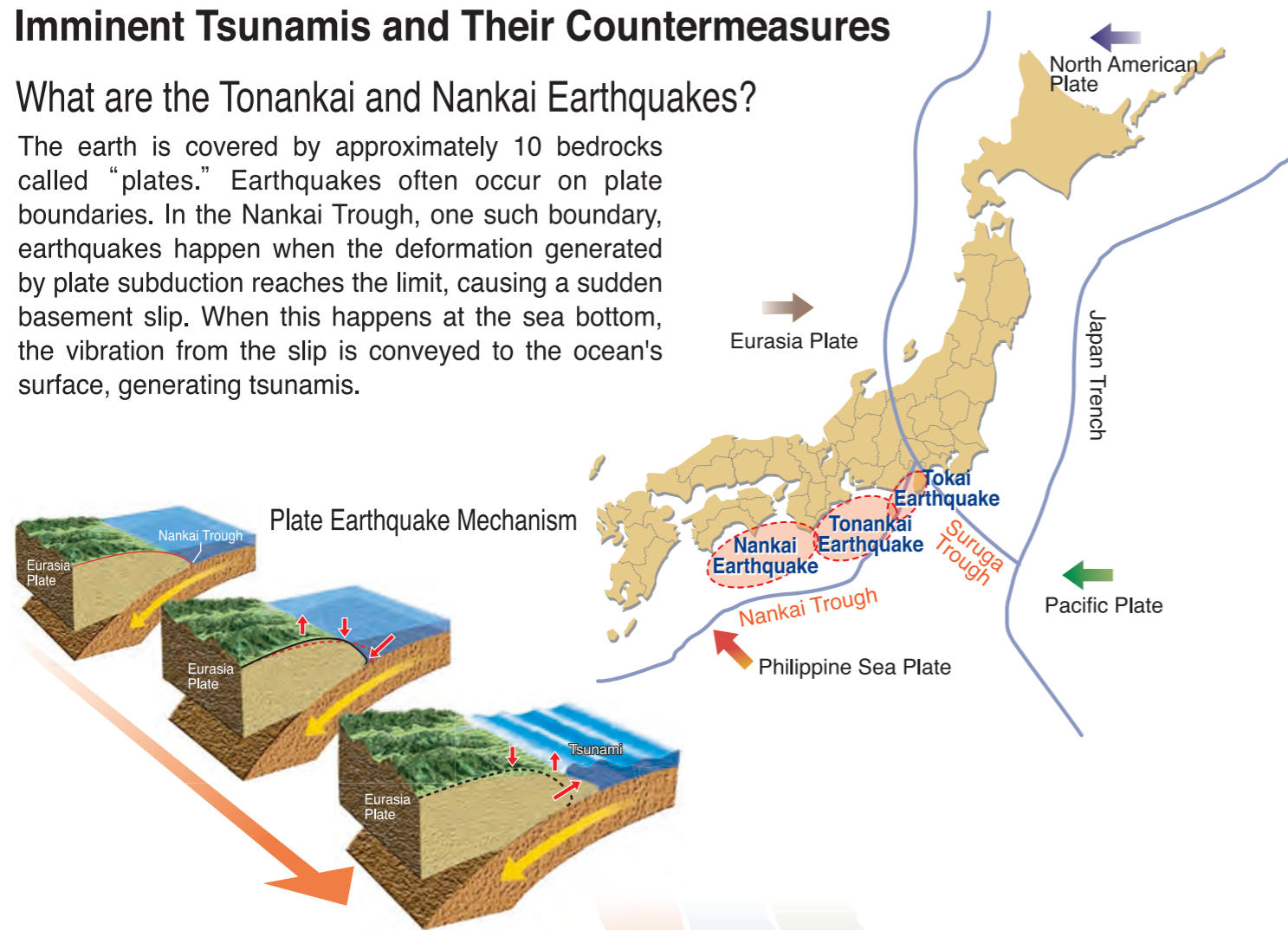
DYNACUBE is a theater where dynamic images are displayed seamlessly on the front, right and left sides, even on the floor. The use of sound effects generated by a floor vibro-acoustic speaker further makes you feel as if you were caught in a real tsunami. This facility helps you experience the fear of tsunamis in an overwhelming, dynamic atmosphere.

Tsunami Dangers Different from Tidal Surge Dangers

Imminent Tsunamis and Their Countermeasures

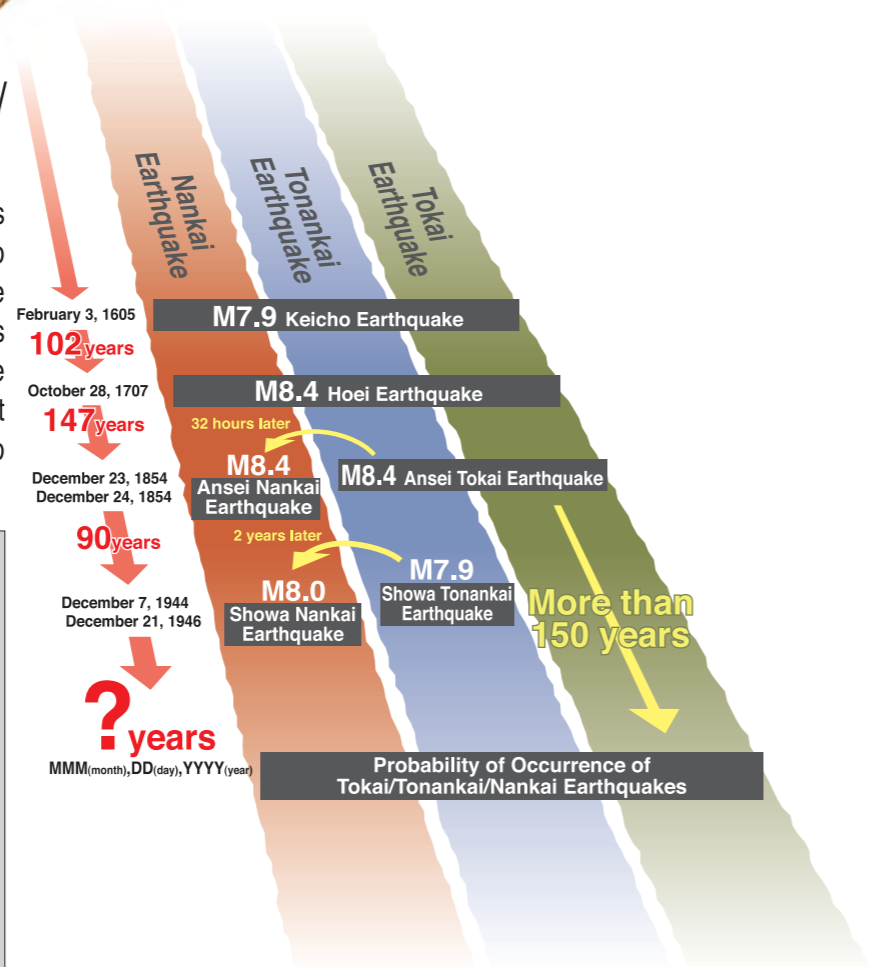
What are the Tonankai and Nankai Earthquakes?

The earth is covered by approximately 10 bedrocks called "plates." Earthquakes often occur on plate boundaries. In the Nankai Trough, one such boundary, earthquakes happen when the deformation generated by plate subduction reaches the limit, causing a sudden basement slip. When this happens at the sea bottom, the vibration from the slip is conveyed to the ocean's surface, generating tsunamis.



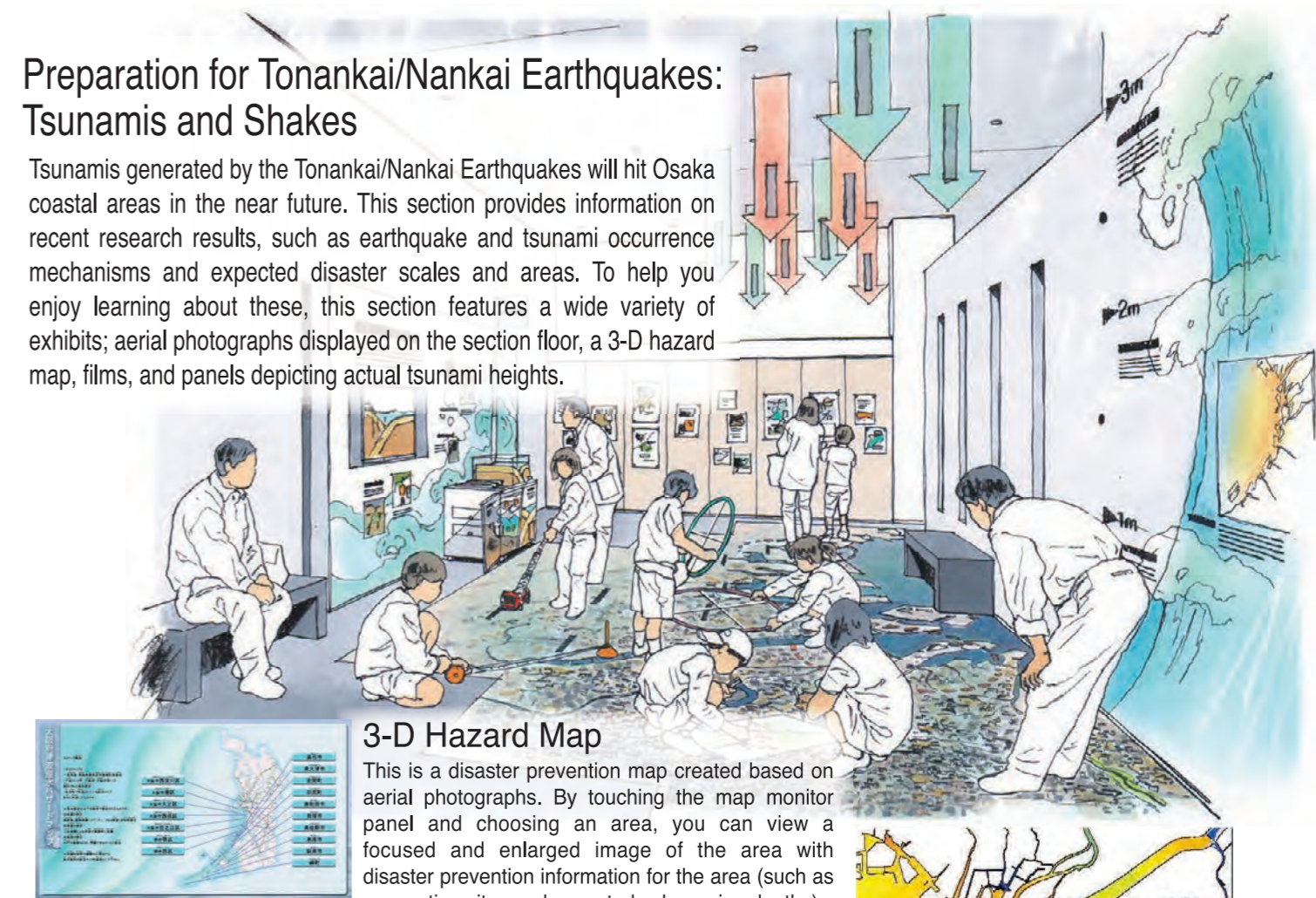
Occurrence Cycle of Tokai/Tonankai/Nankai Earthquakes

It has been identified that giant earthquakes occurred in the Nankai Trough in the past in a 90- to 150-year cycle. It has also been found that, in the three expected epicenter areas, three earthquakes often occur together in a short period of time. More than 150 years have now passed since the last Tokai Earthquake, suggesting there should be no surprise if a giant earthquake occurs tomorrow.



Preparation for Tonankai/Nankai Earthquakes: Tsunamis and Shakes

Tsunamis generated by the Tonankai/Nankai Earthquakes will hit Osaka coastal areas in the near future. This section provides information on recent research results, such as earthquake and tsunami occurrence mechanisms and expected disaster scales and areas. To help you enjoy learning about these, this section features a wide variety of exhibits; aerial photographs displayed on the section floor, a 3-D hazard map, films, and panels depicting actual tsunami heights.



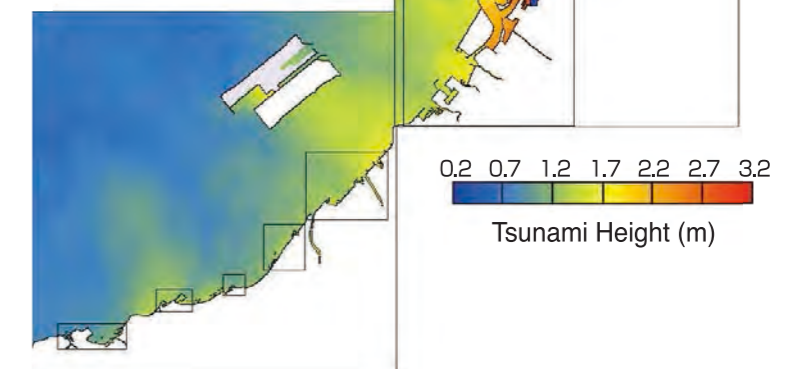
3-D Hazard Map

This is a disaster prevention map created based on aerial photographs. By touching the map monitor panel and choosing an area, you can view a focused and enlarged image of the area with disaster prevention information for the area (such as evacuation sites and expected submersion depths).

Expected Height of Tsunami

In 2003, Osaka Prefecture conducted a tsunami simulation on the assumption that the largest-scale Nankai Earthquake would occur (also examining tsunamis expected to hit coastal areas in terms of height, arrival time and current speed.) The tsunami heights indicated here are expected maximum heights based on the assumption that earthquakes occur at high tide.

- Earthquake Scale: M8.4
- Epicenter: Shikoku - Wakayama Offshore



Knowledge to Protect Your Life from Tsunami Disasters

Study Salon

Must-Dos before and after Evacuation

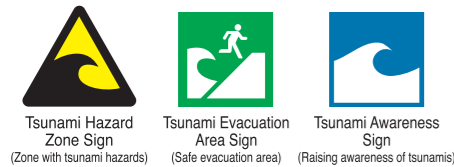
It is important to prepare for earthquakes and tsunamis in your daily life to protect yourself. Let's learn together! Correct knowledge and appropriate actions can save you and your family in an emergency.

5 Points when a Tsunami Strikes

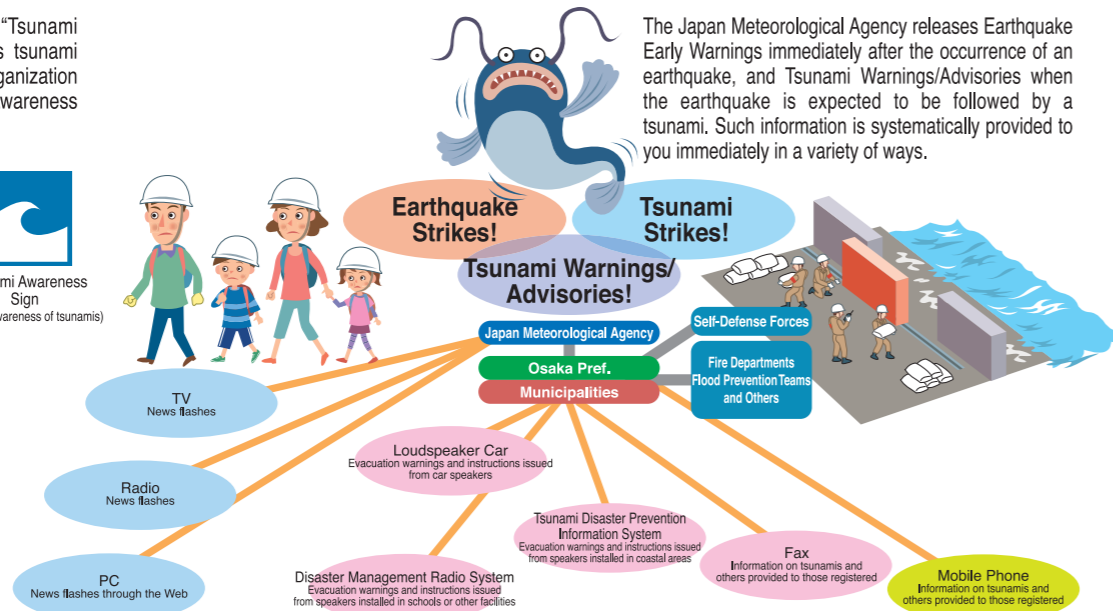
- 1** Be alert to tsunamis when you feel an earthquake! Quickly get away from the sea or river!
- 2** Gather accurate information from TV, radio, etc.
- 3** Evacuate together with others around you immediately after the release of evacuation information.
- 4** Evacuate on foot to higher ground or to the third floor or higher in a building.
- 5** Tsunamis can strike again! Stay at your evacuation site until the evacuation order has been lifted!

Signs Indicating Tsunami Hazards

"Tsunami Hazard Zone Sign" and "Tsunami Evacuation Area Sign" are approved as tsunami evacuation signs by the International Organization for Standardization (ISO). The "Tsunami Awareness Sign" is used on tsunami hazard maps.



How to Get Tsunami Information



Accurate information gathering comes first! Heed information provided by TV and radio.

Importance of Family Meetings on Disaster Prevention

It is important to have occasional family meetings to decide in advance where each person will meet if they cannot contact each other when a disaster strikes.



Confirming the Evacuation Site Location

- Decide where you will meet your family if you are separated from each other in times of disaster.
- Confirm your evacuation site location by actually walking there and checking safe routes.



Confirming How to Get in Contact

- Decide how to get in contact with each other, such as by posting messages at home.
- Confirm telephone numbers of relatives living outside your prefecture.



Confirming Safety Conditions of Your Home

- Ensure that furniture and other objects that might fall are well fixed.
- Ensure that two evacuation exits with different directions are secured.

Other

- Examine how to evacuate with infants, elderly persons or sick persons.
- Examine what to do for your pets.

Some Hours after the Earthquake Strikes
How can you meet your family?



Stock at Home

Always prepare stockpiles to sustain you and your family for about three days, in case water, gas, power and other lifeline utility services are disrupted.

Food



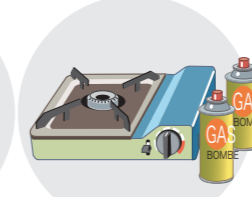
- Prepare non-perishable foods and regularly replace them.

Water



- Three liters of water per person per day
- PET-bottled water and tap water can usually be preserved for approximately one year and three days, respectively.
- Use a water tank without color pigments, which could disperse into the stored water.

Portable Gas Stove



- A portable gas stove is useful if the gas supply is disconnected.
- Gas cylinders and solid fuels, etc. are also useful.

Emergency Kit

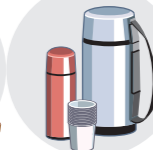
- Prepare a backpack with emergency items to easily take with you in the event of evacuation.
- Just in case, write your name, address, contact and other information to identify you.
- Keep the emergency kit light for smooth evacuation. It is recommended that an emergency kit for a man and a woman weigh up to 15 kg and 10 kg, respectively.
- Check the kit items at least two or three times a year for item quality. Special attention should be paid to food, water and medicines.

Food



At least 2 or 3 meals

Water



1 bottle of water

Radio



A radio with a flashlight or a manually powered radio is useful.

Valuables



Keep your valuables in one place.

Preparation for Earthquakes and Tsunamis - Disaster Prevention Building

Osaka Prefecture is developing a collective management (remote monitoring, control, motorization, etc.) of tide gates and (iron) tide protection gates for opening/shutting operations. As a disaster prevention center in western Osaka for such a sophisticated development, the Tsunami/Storm Surge Disaster Prevention Station seeks to further enhance public awareness of tsunami and tidal surge disasters.

Observation and Operation Room

Established in the Disaster Prevention Building, the Observation and Operation Room is a central control room for tide gates and iron gates. During emergencies, the room serves as a flood prevention center for liaison with relevant organizations.



Meteorological Observatory
Information gathering

Municipal Depts.
Evacuation

Police
Traffic management on closing tide protection gates

Flood Prevention Team
Directions of shutting opening tide protection gates

Tide Gate
Remote monitoring and operation

Iron Gate
Remote monitoring and motorization



Tsunami/Storm Surge Disaster Prevention Station (Disaster Prevention Building)

Nishi-Osaka Flood Control Office Building
Considering countermeasures against tsunamis due to Tonankai/Nankai Earthquakes, the station systematically manages western Osaka's flood control, disaster prevention and water environment development. The building was completed in June 2007.

