みんなde なかよく!
minna de nakayoku manabousai!!
まなぼうさい!!

The Rescue Kids Trio!

What Are Disasters?

This manual was made possible through funding by the Council of Local Authorities for International Relations.

Disasters and emergency preparedness

Emergency preparedness enables you to protect yourself in the event of a natural disaster. So what kind of disasters can happen?

Disasters

This manual will define disasters as events that cause structural damage and human injuries such as fires, explosions and extreme natural phenomena involving wind, rain, snow, floods, storm surges, earthquakes, tsunamis and volcanic eruptions.

1. Heavy rainfall

Short bursts of heavy rainfall can cause a tremendous degree of damage.
They trigger floods from overflowing rivers as well as landslides and inundation from water-saturated soil.

A picture of flooding from heavy rains in July 2010

Rainfall (precipitation) measurement

Rain is measured by the height of water that accumulates over a period of time, typically in millimeters (mm) per hour.
Officials issue a heavy rain advisory when rainfall reaches about 20 to 40 mm per hour and a heavy rain warning when it reaches about 40 to 60 mm per hour.

Measures and descriptions of rainfall intensity

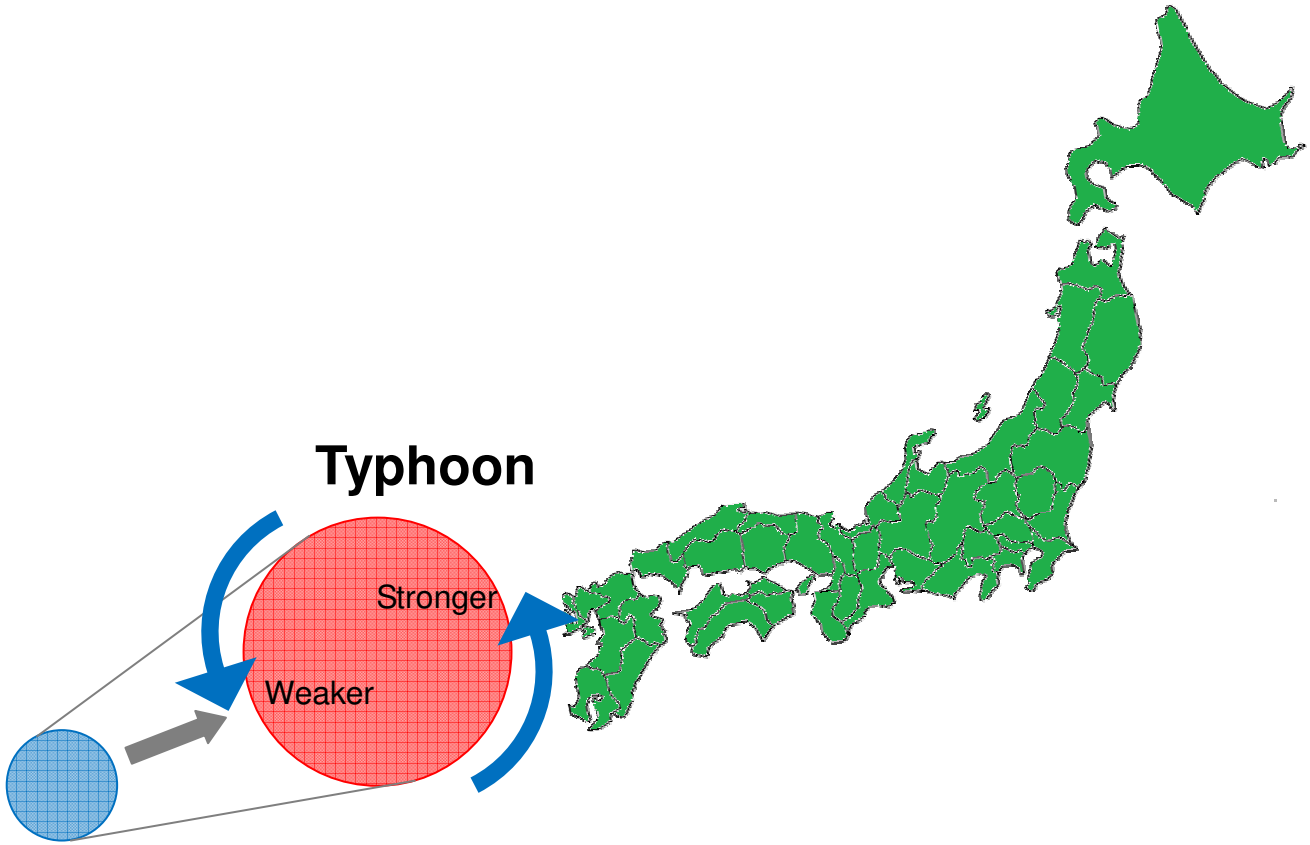
* From material provided by the Japan Meteorological Agency

Rainfall per hour	Terminology	Description
10 - 20 mm	Moderately strong rain	The rain is so loud people may have difficulty hearing others talk.
20 - 30 mm	Strong rain	The rain is so strong the gutters and sewers may overflow.
30 - 50 mm	Heavy rain	The rain is so strong it’s enough to overturn a bucket.
50 - 80 mm	Very heavy rain	The rainfall begins to mimic a waterfall.
80 mm or more	Torrential rain	The rain is so strong it’s difficult to breath, even causing a sense of dread.

2. Typhoons

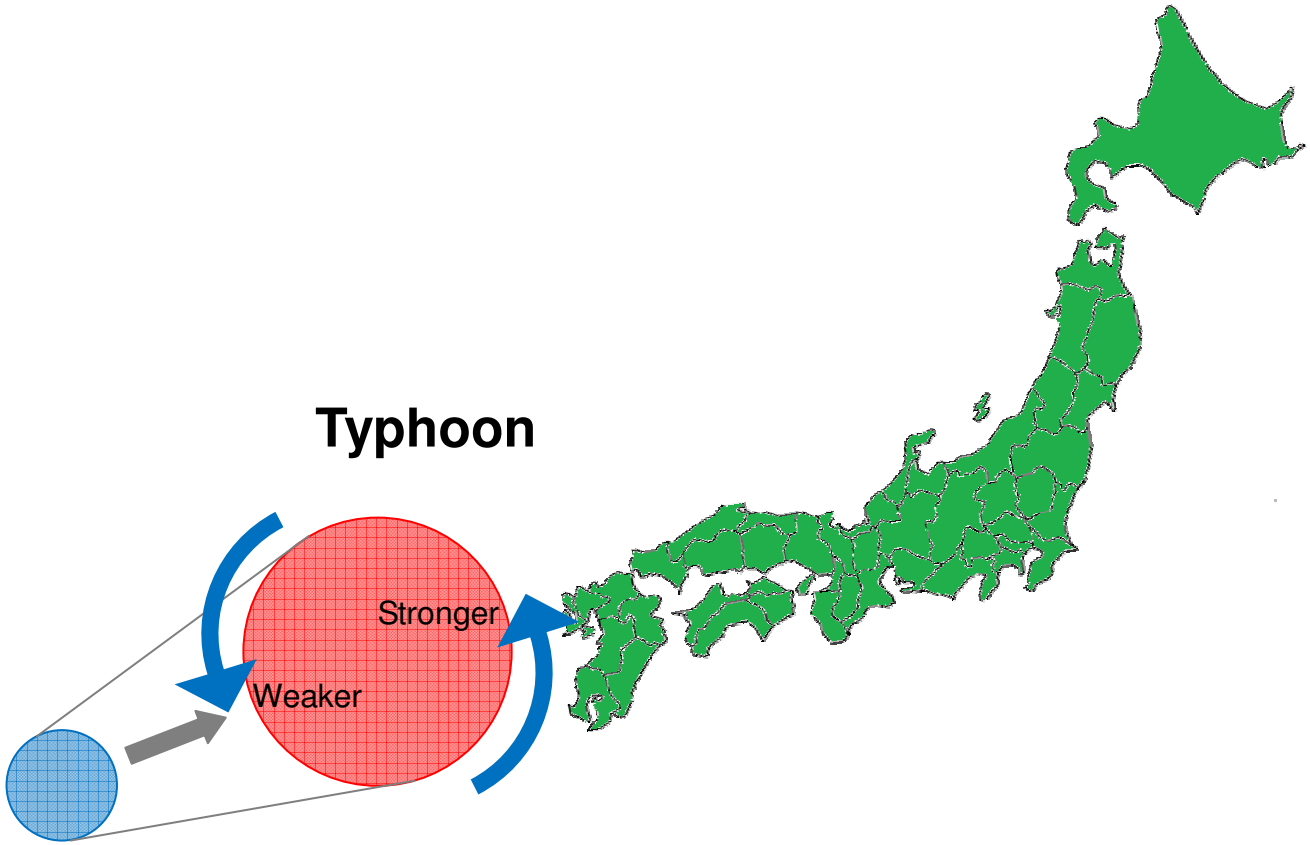
Typhoons are large spinning storms that form on the warm southern oceans and generate high-speed winds.
Many typhoons hit Japan. They bring strong winds, heavy rains and storm surges that lead to much destruction.

Typhoon direction and intensity



Almost all of the typhoons that make landfall on Japan travel southwest to northeast (in other words, from the bottom left to the bottom right of a map of Japan).

Typhoon direction and intensity



The wind and rain on the right side (in other words, east) of the path of a typhoon is stronger than on the left side (in other words, west). Be careful of the intense wind and rain that typhoons bring.

3. Landslides

From June to July 1999, landslides triggered by heavy rains led to much damage in Hiroshima.

Pictures of landslide damage in the Asaminami and Saeki Wards of Hiroshima City in June 1999.

Types of landslides

Types of landslides called slope failures, earthflows and mudslides occur when water from heavy rains saturate and weaken the soil.

Slope failure

Slope failures happen when heavy rains or earthquakes weaken the ground and cause it to collapse.

Earthflows

Earthflows occur when rainwater saturates slippery clay-like soil on moderate slopes and causes the land to move.

Mudslides

Mudslides are a mixture of soil, rocks and water that flow rapidly downhill when valleys and mountains experience long-term rains or torrential rainfall from typhoons.

Hiroshima Prefecture has about 32,000 landslide danger zones, the most in Japan.

It’s important to remember that areas near mountains and hills are vulnerable to landslides.

4. Storm surges and tsunamis

Storm surges and tsunamis are capable of inflicting damage to areas near the sea and rivers.

Storm surge

Tsunami

Storm surges

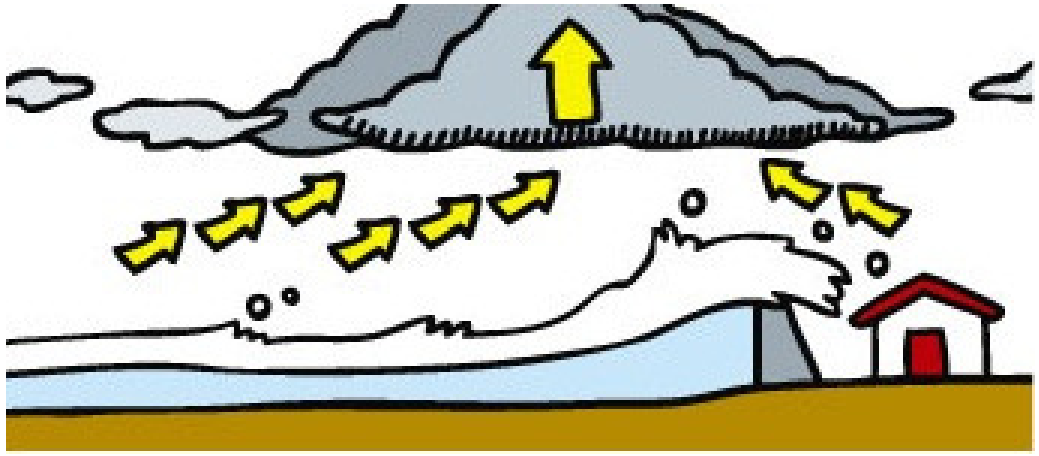
Storm surges occur when sea levels rise above normal.

Water from the sea and rivers can overflow during storm surges. This overflow subsequently leads to flooded roads and houses, and leaves behind major damage.
Be sure to take care even in areas that are not close to rivers or the sea.

Causes of storm surges

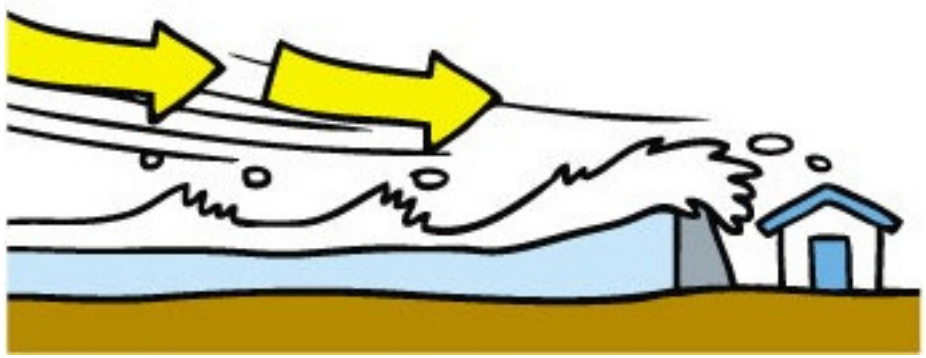
There are three major causes of storm surges.

Low pressure systems



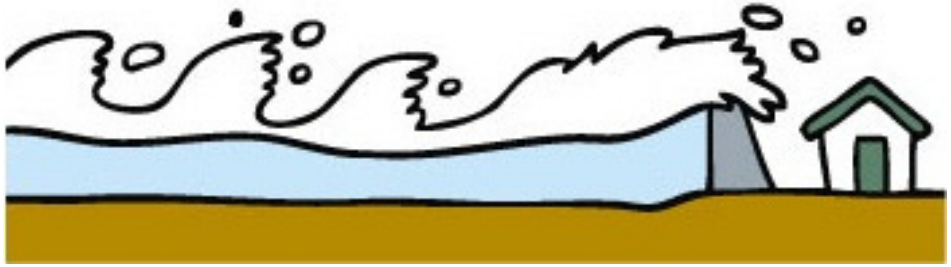
Low atmospheric pressure in the center of typhoons and storms forces sea levels to rise.

Strong winds



Powerful ocean winds blowing toward land push the sea level up.

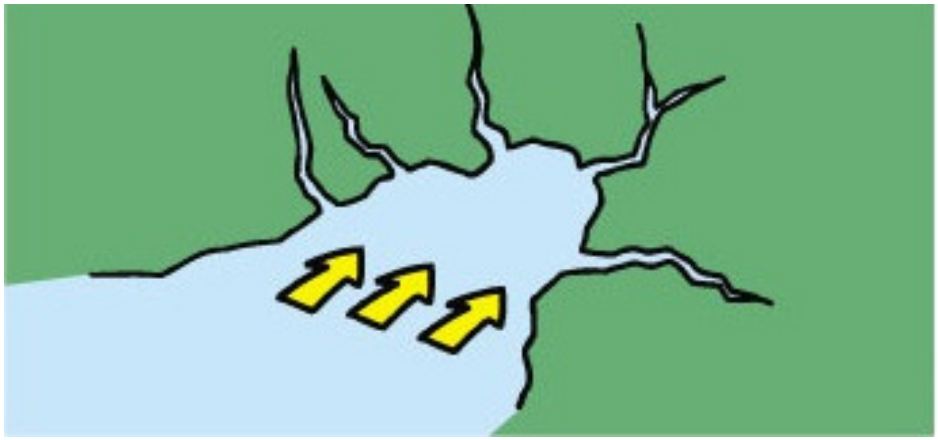
Tidal waves



Tall waves crashing onto the shore with rapid frequency cause the ocean surface to rise.

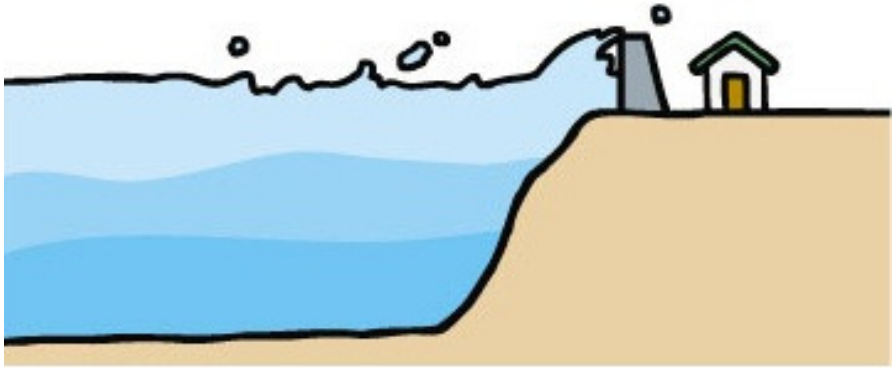
Dangerous areas to avoid during storm surges

River mouths

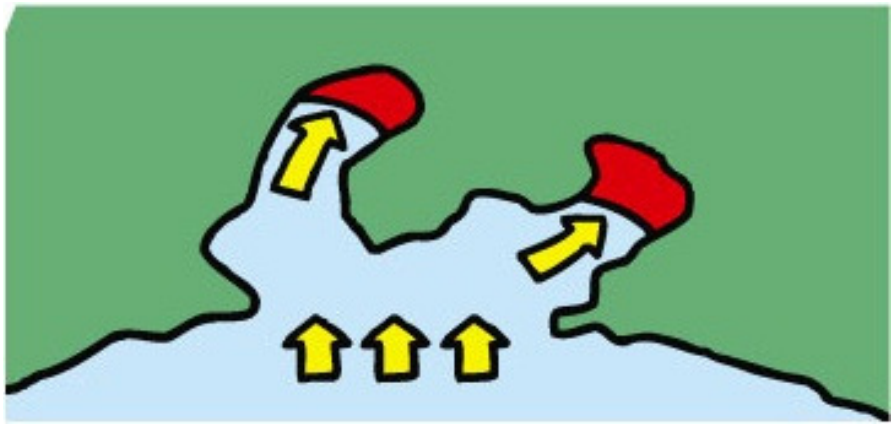


The terrain near the sea, especially in the region of river mouths, is particularly vulnerable to the devastating effects of storm surges.

Sharp drops in the seafloor



Inland boundaries of harbors



Other dangerous areas that easily flood in the event of a storm surge include land below sea level and valleys between hills and mountains.

Tsunamis

Coastal regions become very dangerous places when an earthquake triggers a tsunami. We saw in the Great East Japan Earthquake of 2011 that the tsunami generated by the earthquake led to greater damage and more human casualties and disappearances than the earthquake itself.

The destructive force of the tsunami in the 2011 disaster

Astonishing tsunami facts

(1) Tsunami waves can hit land at speeds as fast as jet aircrafts!

The fastest waves reach 800 to 1,000 kilometers per hour (500 to 600 miles per hour). Although the waves lose force once on land, they can still travel as fast as cars.

(2) Small tremors and overseas earthquakes also generate tsunamis!

Dangerous tsunamis can happen if an earthquake seems minor or strikes far away.

(3) Tsunami waves are incredibly tall!

Tsunami waves can reach heights beyond imagination. Some waves during the Great East Japan Disaster were observed to be as high as 40 meters (130 feet) tall.

(4) Tsunami waves hit multiple times!

Tsunamis usually generate two or three waves, so don't become complacent after the landfall of the first wave. There will probably be more to come.

Experts believe that Hiroshima Prefecture will probably not experience a tsunami on the scale of the one that struck East Japan in 2011.

However, it's worthwhile to keep in mind the features and potential dangers of tsunamis because we still don't know when and where they will strike.

5. Earthquakes

On March 11, 2011, an earthquake struck the Tohoku region and released the largest amount of energy in the recorded history of Japan.
The Great East Japan Disaster consequently resulted in more than 19,000 dead or missing. Many fires also erupted because of the earthquake.

Seismic magnitude and intensity

Magnitude measures the energy released by an earthquake, while intensity measures the ground-shaking effect.

Intensity tends to fall as one moves further away from the epicenter.

A rise in magnitude of one unit is equivalent to a 32-fold increase in the amount of energy released.

Damage from the 2011 earthquake



From the [disaster database managed by the Institute for Fire Safety and Disaster Preparedness]

Earthquakes can strike anytime and anywhere in Japan, so it's very important to plan in advance. Some things you can do right now include preparing a survival kit, learning where evacuation shelters are located and discussing with family members ways to communicate during disasters.

Be prepared!

Disaster can strike anytime, anywhere.

Don’t fool yourself into believing that somehow you will be safe.

Learn about disasters and be prepared.

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