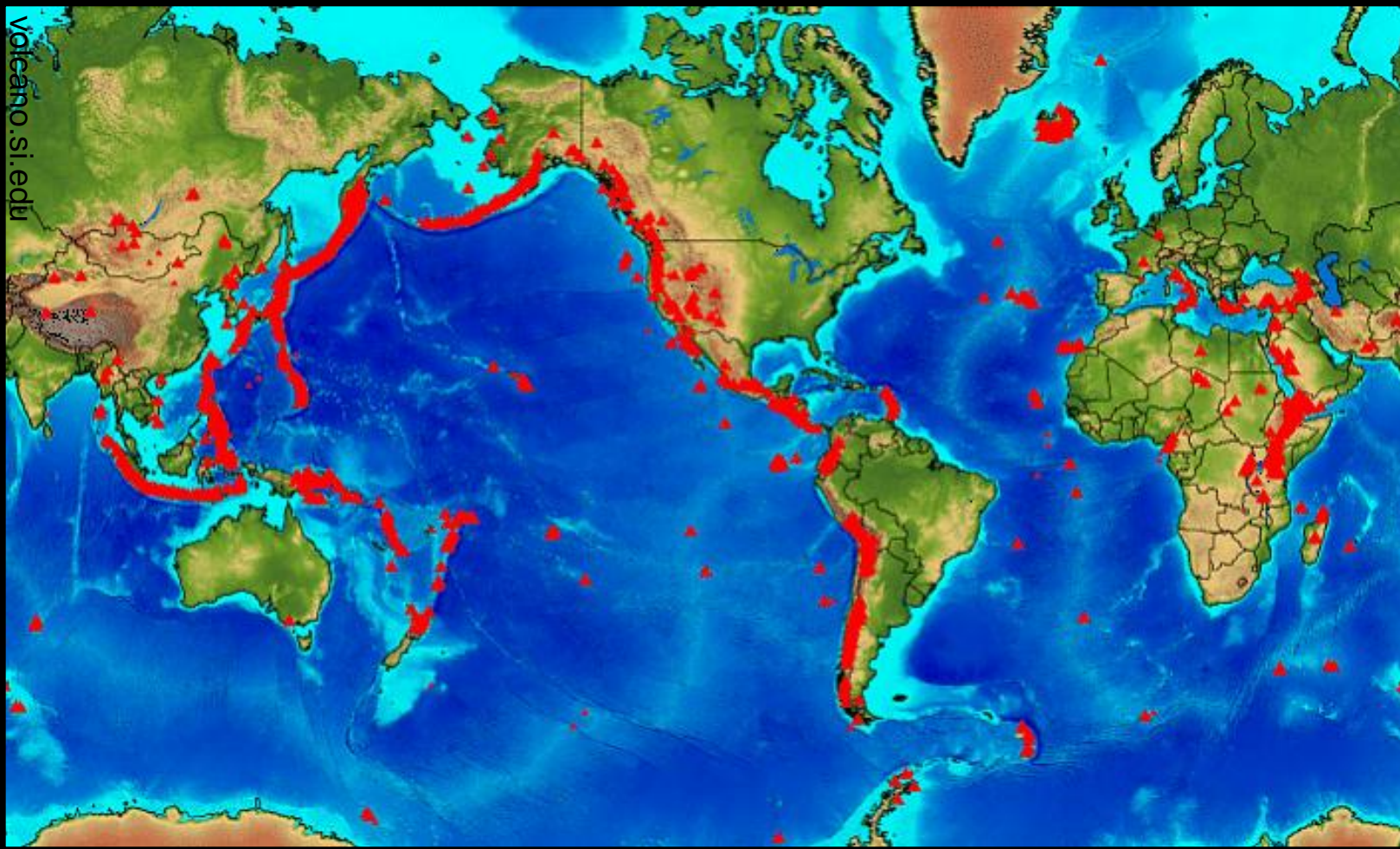


DISASTER ZONE



DEADLY HAZARDS:

VOLCANOES



The red triangles show where active volcanoes are located. Volcanoes are often found along the boundary between two tectonic plates.



VOLCANOES

Some volcanoes
are high
mountains....

photovolcanica.com



....others are
just vents in
the ground.



Afar Consortium



VOLCANOES

Some volcanic eruptions are effusive (gentle)....



boston.com



Mary Jo Penkala/Solent News & Photo Agency

....others are explosive. These eruption columns can be over 30 km high.



VOLCANOES

Many volcanoes are close to towns and cities. Scientists monitor these volcanoes carefully to try and keep people safe.



National Geographic



VOLCANOES

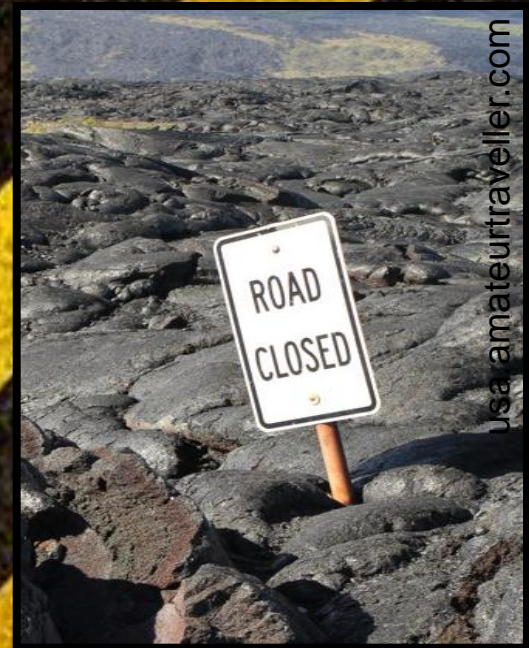
Lava flows are quite slow, but they destroy buildings, crops, and roads.



Science Photo Library



USGS



usa.amateurtraveller.com



VOLCANOES

Volcanoes can produce huge volumes of ash. Ash kills plant life, makes driving very dangerous, and damages jet engines. Ash looks like dust, but it's very heavy – it made this aeroplane tip over.



Guardian.co.uk



jelopnik.com



National Geographic



popsci.com



VOLCANOES

Lahars (sometimes called mudflows) happen when volcanic ash mixes with water. They travel many miles from the volcano, and can bury entire towns in minutes.

montserratvolcano.org



Jeannie Scott



VOLCANOES

mnh.si.edu



flatrock.org.nz

Pyroclastic flows are the deadliest volcanic hazard. Scorching clouds of gas, ash, and rocks race along the ground at up to 100 km per hour, burning everything in their path.



VOLCANOES



Volcanoes emit toxic gases, including sulfur, fluorine, and chlorine. These gases often form acid clouds or acid rain, making the air dangerous to breathe, destroying plant life, and even corroding metal.

sophia.smith.edu

CAUTION
VOLCANIC FUMES ARE HAZARDOUS TO YOUR HEALTH AND CAN BE LIFE-THREATENING VISITORS WITH BREATHING AND HEART PROBLEMS, PREGNANT WOMEN AND YOUNG CHILDREN SHOULD AVOID THIS AREA



wikipedia


VOLCANOES

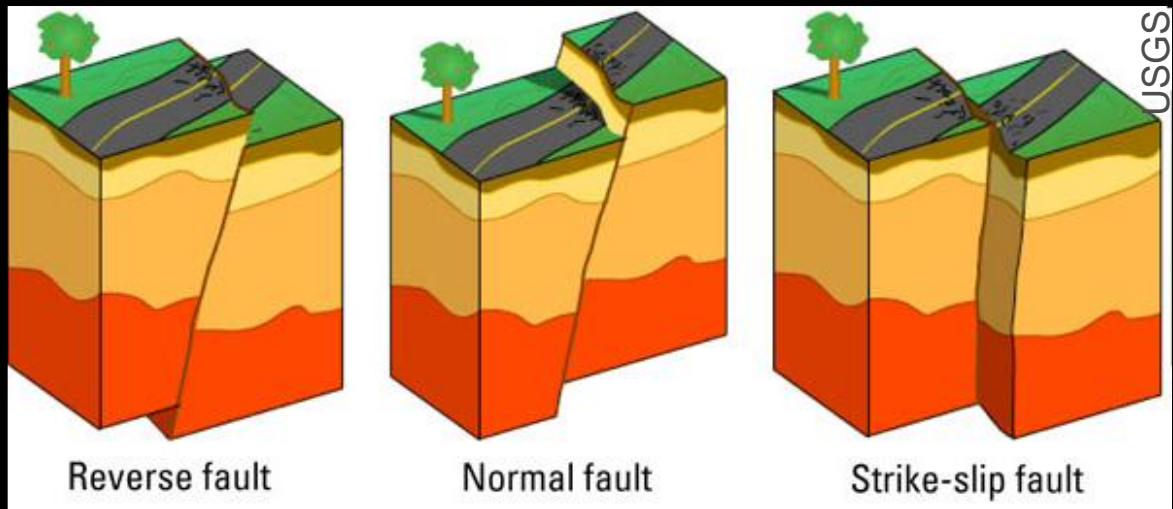
DISASTER ZONE



**DEADLY HAZARDS:
EARTHQUAKES**



Earth's crust is made up of moving pieces called tectonic plates. Earthquakes happen along faults at the edges of these plates.



 **EARTHQUAKES**

Earthquakes can open large cracks in the ground.

abcnews.go.com



USGS



EARTHQUAKES



ncgeol.soc.org

These fences have been pulled apart by two tectonic plates moving in different directions.



USGS



EARTHQUAKES



cbsnews.com



USGS

Earthquakes can trigger tsunamis and landslides.



EARTHQUAKES



kimedia.wordpress.com

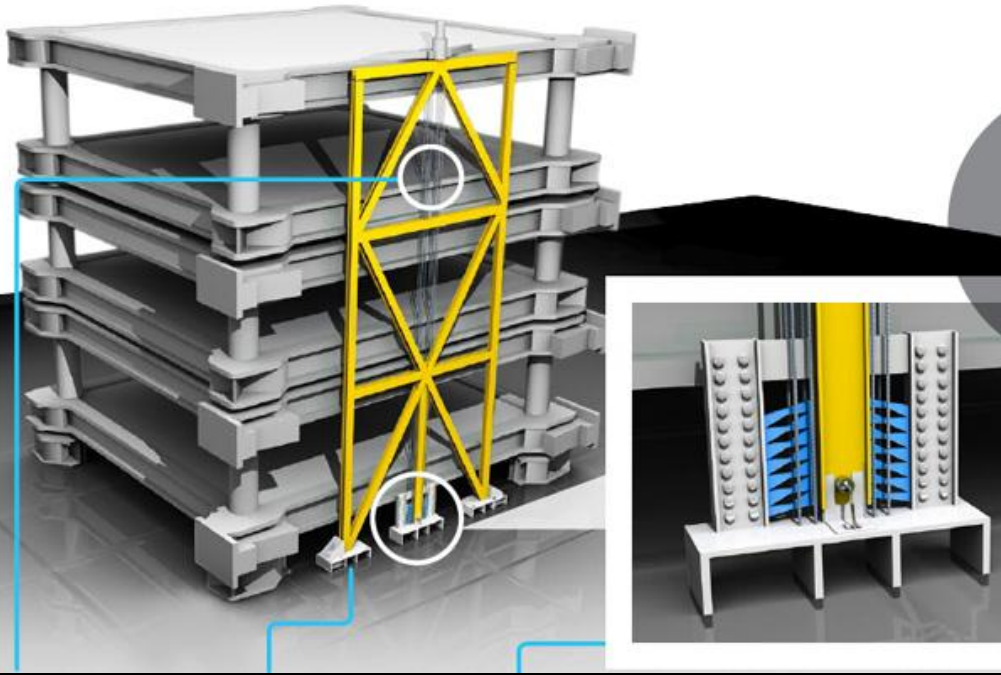
Many buildings collapse during earthquakes.



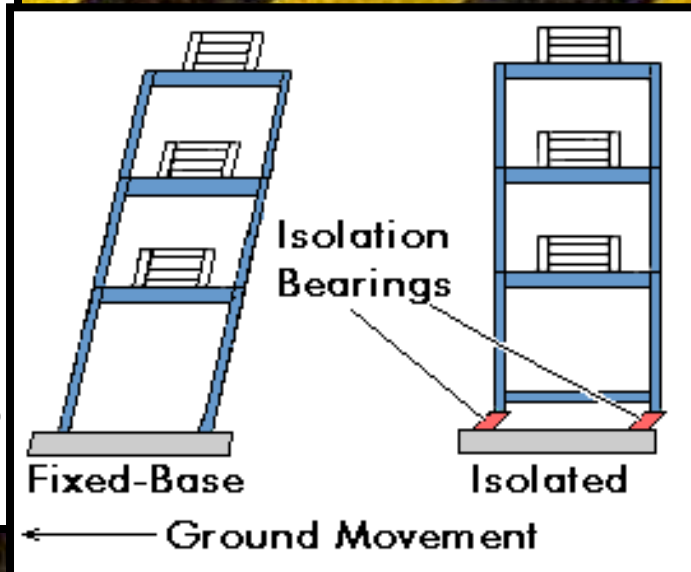
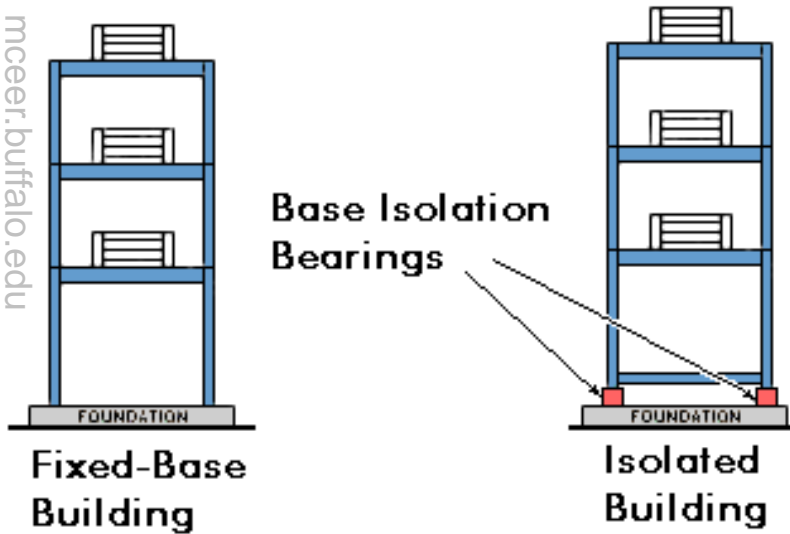
foxnews.com



EARTHQUAKES



Earthquake-proof buildings are designed not to collapse. This technology can save many lives – but earthquake-proof buildings are expensive.





coolgeography.co.uk

There are many earthquake-proof buildings in Japan and California, where earthquakes are common.

tokyoessentials.com



EARTHQUAKES



Most old buildings are not earthquake-proof, but this building in Turkey has survived earthquakes for 1500 years!



EARTHQUAKES

DISASTER ZONE



DEADLY HAZARDS:

HURRICANES



Very large tropical storms only happen in some parts of the world, and they always move along the same paths.

In the Atlantic, they are called hurricanes; in the Pacific, they are called typhoons; in the Indian Ocean, they are called tropical cyclones.

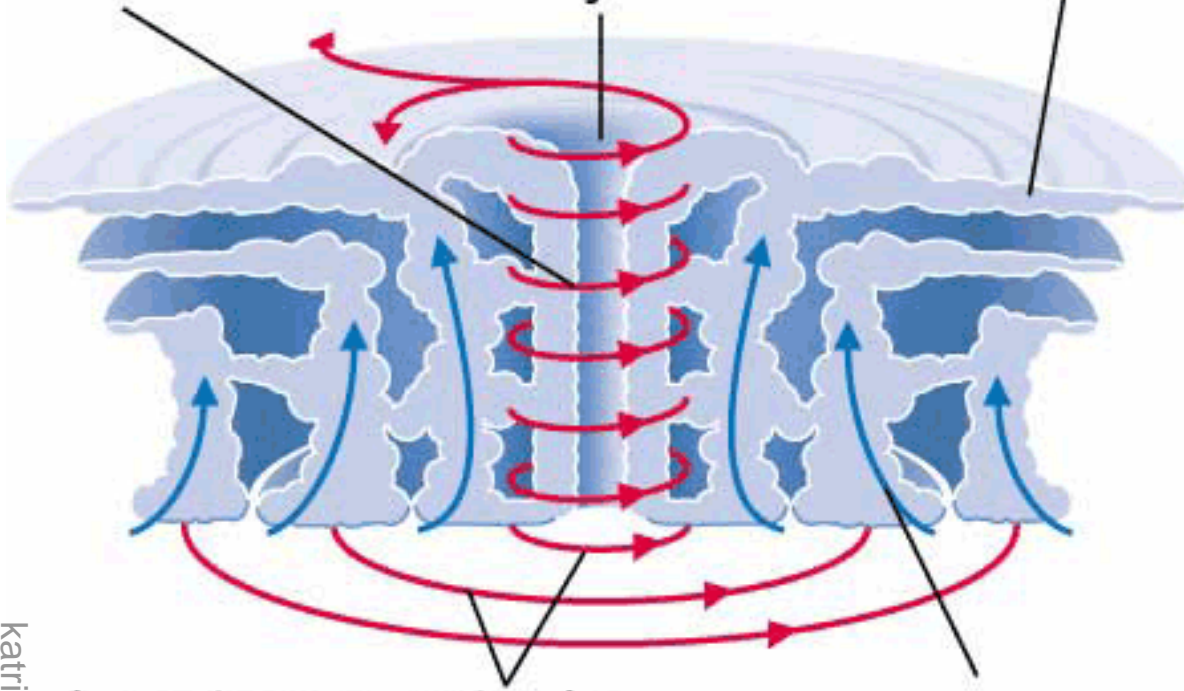


HURRICANES

convection
currents

cool dense air

eye



hurricane winds
and rain

warm
moist air

Hurricanes start over the warm tropical sea, and travel toward land.

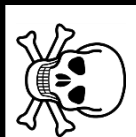
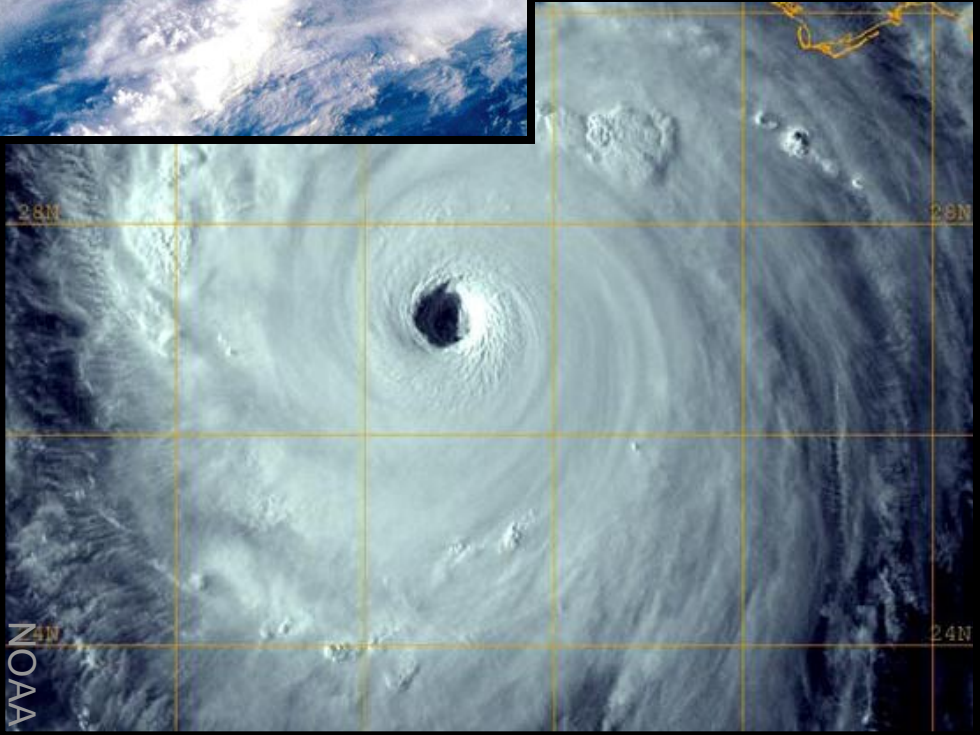
Hurricanes are giant, spinning storms. They start as small storms, but grow until they are hundreds of miles wide.



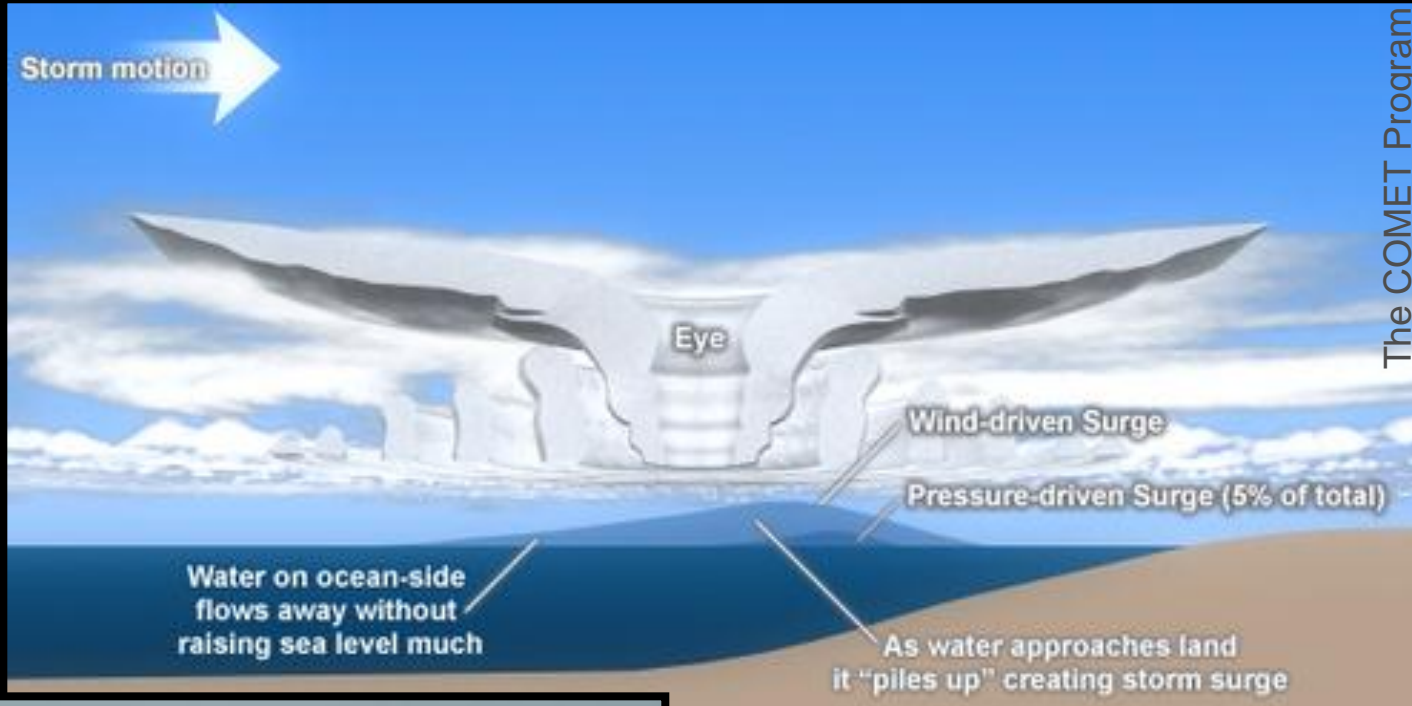
NOAA



Hurricanes are so big,
they are easy to see from
space.



HURRICANES



Hurricanes are so powerful they push the seawater up onto the land. This is called a storm surge. It is the most dangerous hurricane hazard.

Tropical storms become hurricanes when their wind speed reaches 74 mph. The strongest hurricane winds are over 155 mph.

AFP



NOAA



HURRICANES

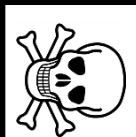
katrinadestruction.com



Hurricane winds and storm surges are very destructive.



NOAA



HURRICANES



Hurricane Katrina hit the US in 2005, destroying special dams, called levees.

The flood waters covered 80% of the city of New Orleans.



HURRICANES

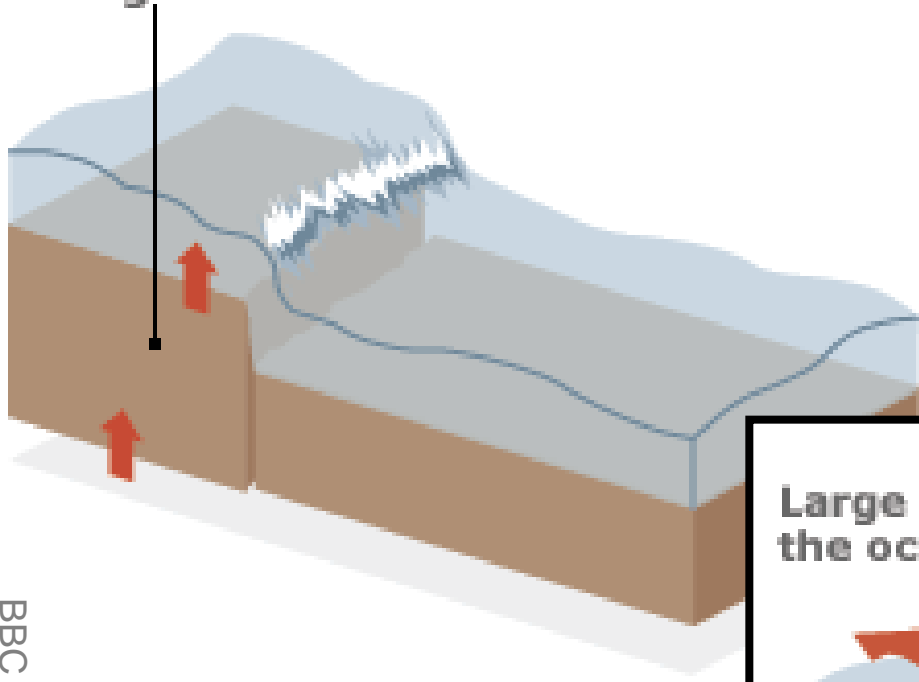
DISASTER ZONE



DEADLY HAZARDS:

TSUNAMIS

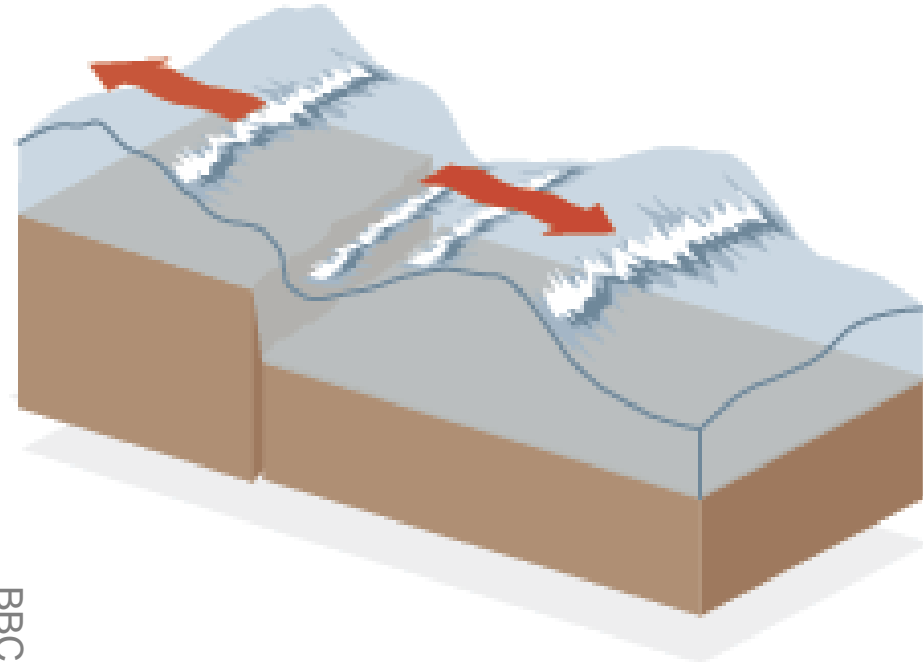
Earthquake vertically jolts seabed, lifting it several metres.



BBC

How to start a tsunami....

Large waves begin moving through the ocean, away from the epicentre.



BBC


T S U N A M I S



National Geographic

The large waves eventually hit land.



BBC



T S U N A M I S



Wikipedia



globalpost.com

The large waves eventually hit land.


T S U N A M I S



As the waves move into the shallows, the moving water can form powerful whirlpools.



On Boxing Day 2004, an earthquake triggered a tsunami which killed over 200,000 people in 13 countries around the Indian Ocean.



toonhkt.blogspot.com



T S U N A M I S



mirror.co.uk



mirror.co.uk

There are early-warning systems to let people know when tsunami waves are coming. But if the tsunami begins very close to land, there isn't time to sound the alarm. This is what happened in Japan in 2011.



DISASTER ZONE



DEADLY HAZARDS:

WILDFIRES



alaska-in-pictures.com

Some wildfires are started by lightning, but many are started by people, either by accident or on purpose.



After a long dry spell, grass, bushes, and trees burn very easily.

National Geographic



serc.carleton.edu



WILDFIRES



metro.co.uk



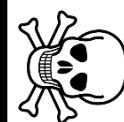
oregonlive.com

Strong, dry winds can help wildfires move extremely fast.





Wildfires are very difficult to control – they often destroy houses.



WILDFIRES



flightglobal.com

Fighting wildfires can be very dangerous.

Aeroplanes and helicopters are sometimes used to drop water and chemicals on the fires from above.



WILDFIRES



nps.gov

Where wildfires are likely, lookout towers are often used. Park rangers or volunteers watch for smoke – if the fire is caught early, it might be easier to put out.



thedenverchannel.com



WILDFIRES

DISASTER ZONE

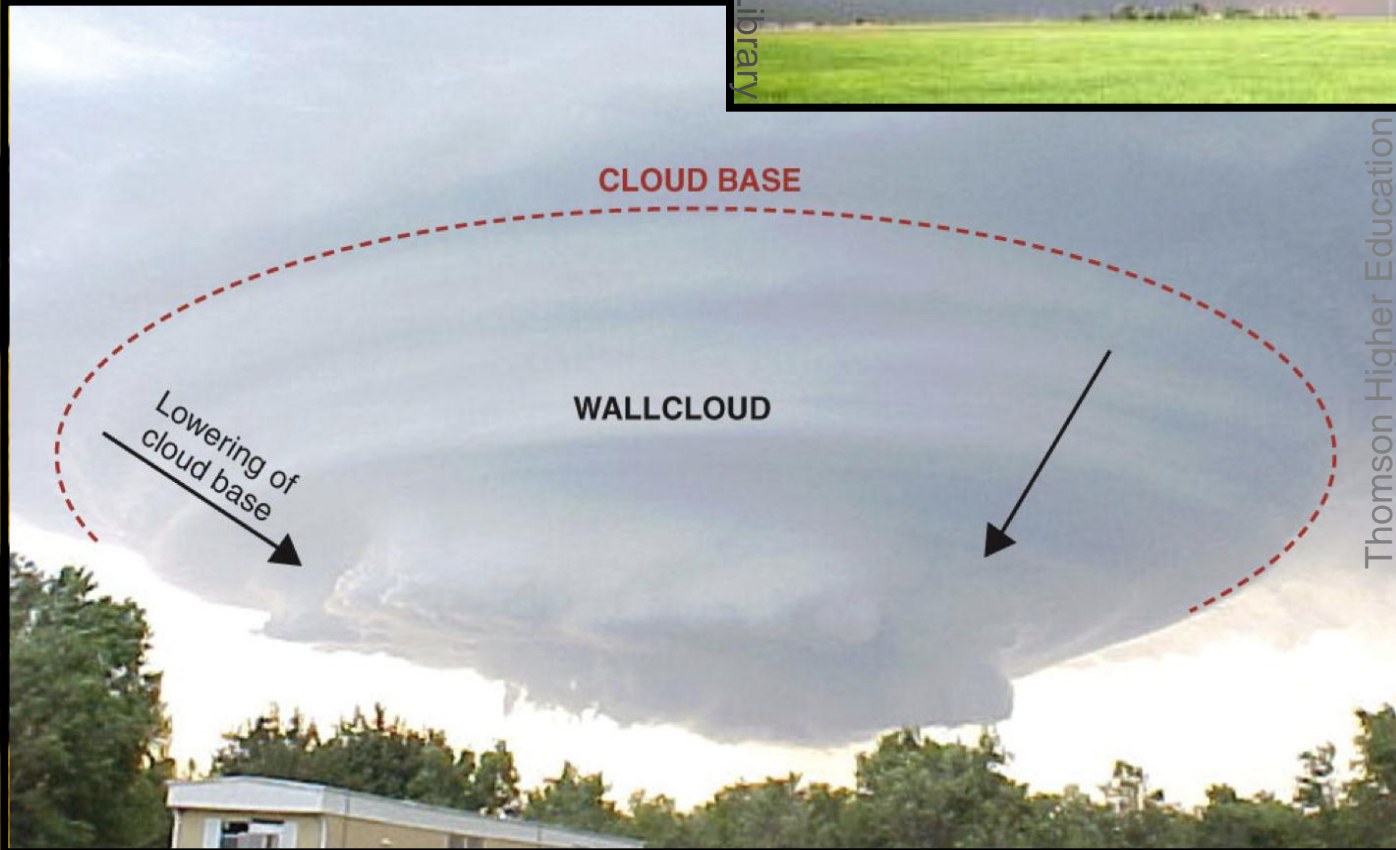


DEADLY HAZARDS:

TORNADOES

Tornadoes form when the cloud base of giant, organized thunderstorms lowers toward the ground.

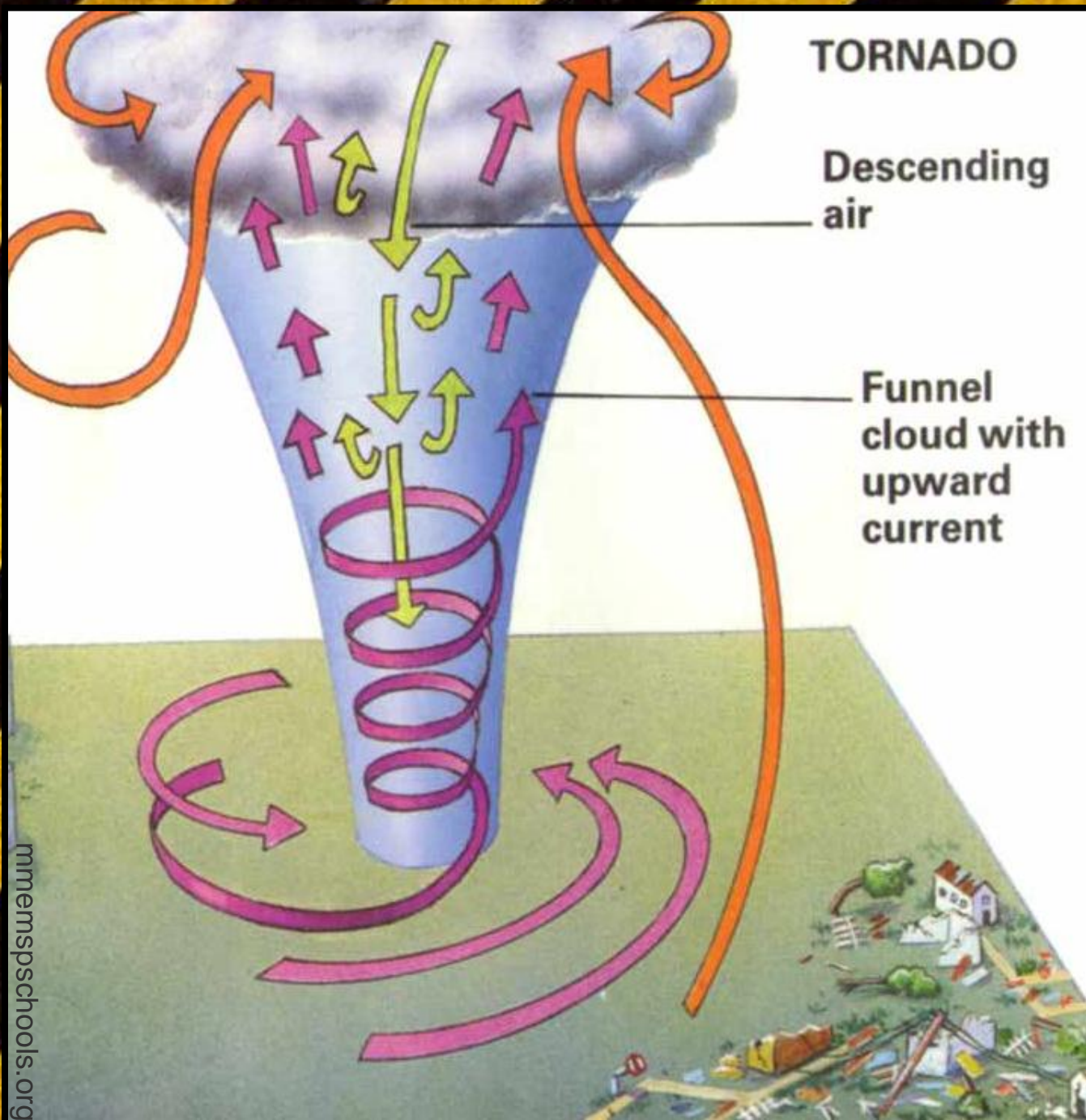
Science Photo Library



Thomson Higher Education



TORNADOES



TORNADO

**Descending
air**

**Funnel
cloud with
upward
current**

Tornadoes are spinning columns of air lowered from the cloud to the ground. Many tornadoes can form from one stormcell.



TORNADOES



NCAA



usatoday.com

Tornadoes don't last long – usually just a few minutes.



TORNADOES



usatoday.com

The winds in a tornado can be over 250 mph. Some tornadoes stay over the same patch of ground – others move forward at up to 70 mph.



Matt Crowther



TORNADOES



Tornadoes are most common in the US, but there are be over 100 small tornadoes in Britain every year!



TORNADOES

NOAA



universetoday.com

Where tornadoes are common, scientists watch storm clouds carefully. If they think tornadoes are going to form, they sound alarms so people can take shelter.



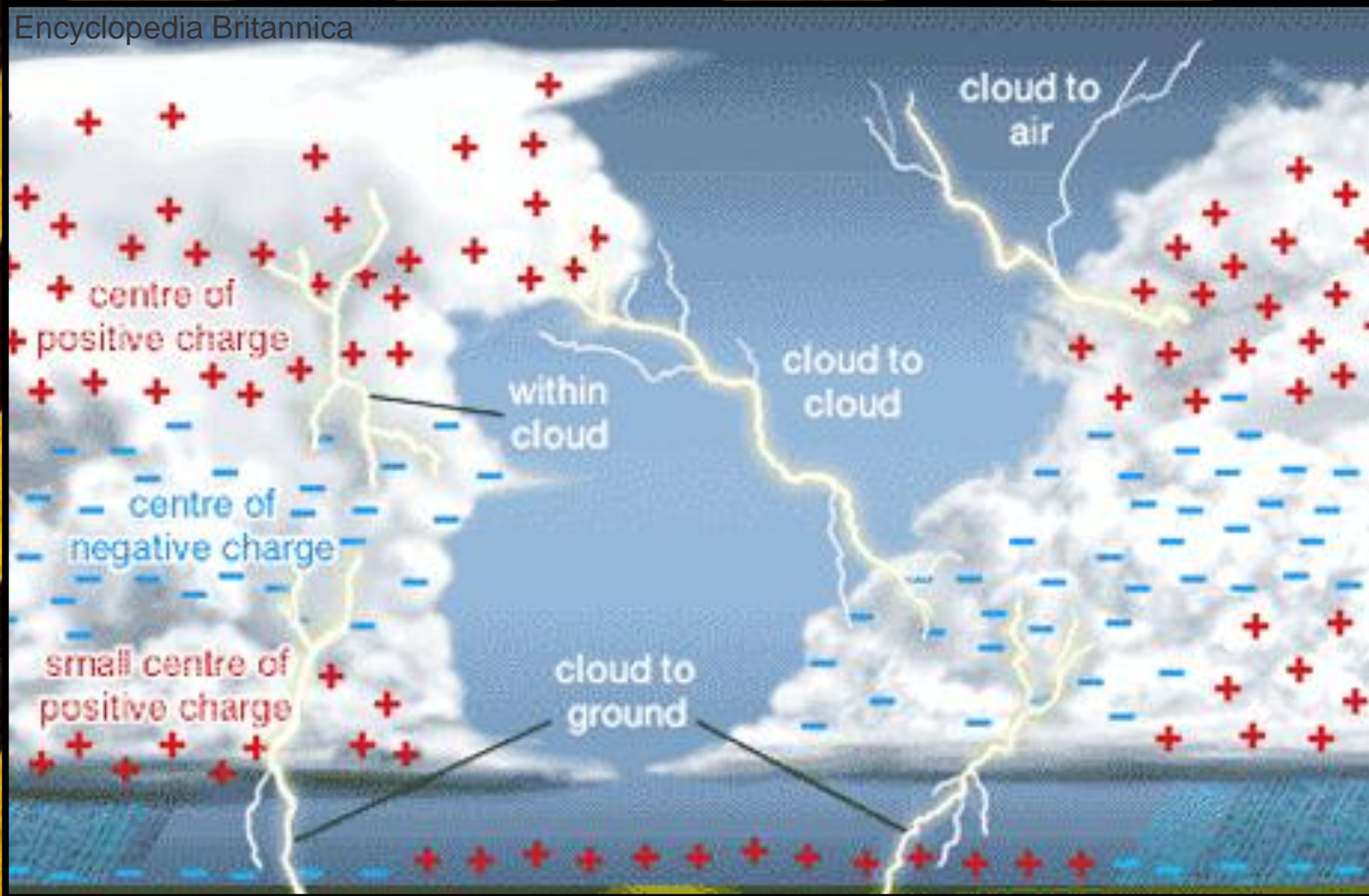
TORNADOES

DISASTER ZONE



DEADLY HAZARDS:

LIGHTNING



Thunderclouds have electrically charged layers. Lightning happens when electrical charge is exchanged – between cloud layers or between clouds and the ground.



LIGHTNING



Lightning can be over $27,000^{\circ}\text{C}$ – that's 5 times hotter than the surface of the sun!



LIGHTNING

Lightning can travel at
140,000 miles per hour!

NOAA



LIGHTNING

Every year, the Earth experiences an average of 25 million lightning strikes.

That's more than a hundred lightning bolts every second.



NOAA



LIGHTNING

Lightning is attracted to objects that are higher than their surroundings, like trees, skyscrapers, and even umbrellas and golf clubs.



science.howstuffworks.com



wsmweather.com

Lightning often strikes the same place again and again.



LIGHTNING



Hundreds of people are struck by lightning every year.



LIGHTNING