



APRIL 27-30, 2020

TOPIC: OTHER GEOLOGIC HAZARD

According to United Nations Office for Disaster Risk Reduction (UNISDR) Geologic hazards are “geologic process that may cause the loss of lives , injuries, damage to property, social economic disruption as it may result in the loss of livelihood ,or environmental damage,”

Glossary of Environment Statistics, Studies in Methods, Series F, No. 67, define geologic hazard as extreme natural events in the crust of the earth that pose a threat to life and property, for example, earthquakes, volcanic eruptions, tsunamis (tidal waves) and landslides. There are two major types of geologic hazards:

1. Sudden Geologic Hazards

Landslide

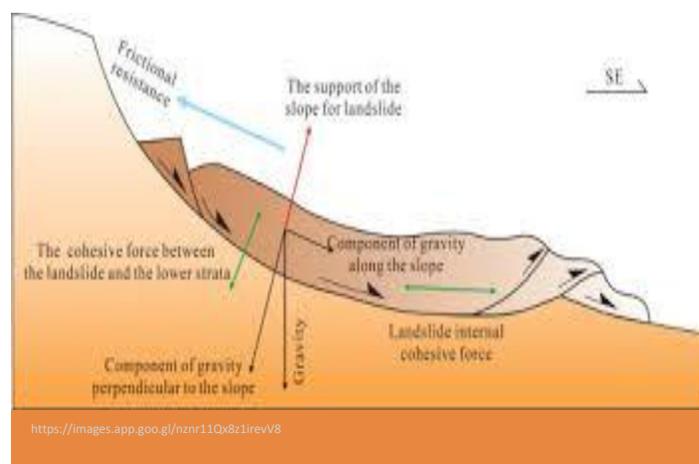
General term for all types of surface movement, particularly those involving the mass downhill movement of soil, rock or snow due to gravity, including the landform that result from each movement.

- Massive outward and downward movement of slope forming material
- The term landslide is restricted to movement of rocks and soil masses

Kinds of Landslide

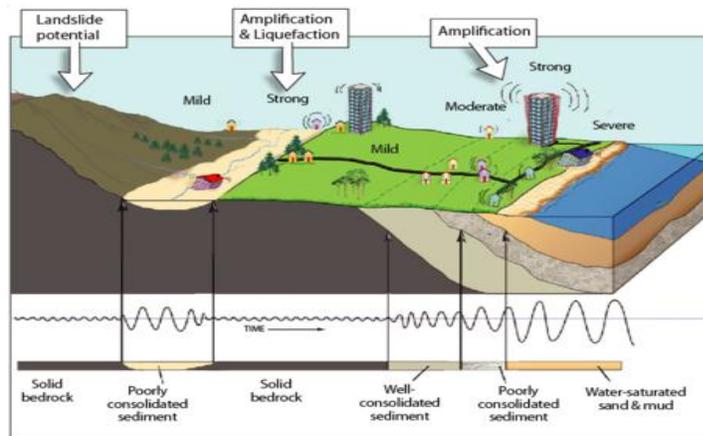
1. Submarine Landslide

- Landslides underwater
- Earthquakes or movement of tectonic plates and other factors can induce landslide under water



2. Liquefaction Landslide

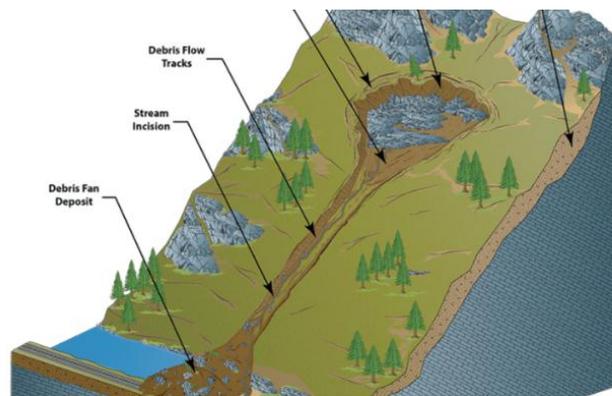
- Related to seismic activity that is essentially limited to earthquakes, cause by fissuring or subsidence on the ground, such as when sand and silt , or soil in general , behave as viscous fluids rather than soil.
- It also triggers other landslide, such as translational and rotational slide failures,as well as lateral spreads.



<https://images.app.goo.gl/pHMF4kEV6HXbt16RA>

3. Lahar and Debris Avalanche

- Considered largest landslide in recent history in terms of volume
- It is a volcanic mud flow or volcanic debris flow made of slurry of pyroclastic material, rocky debris, and water.



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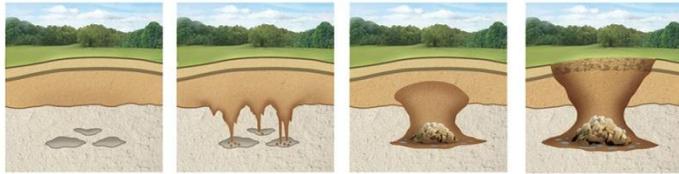
Types of Movement

- Fall- occurs when soil or rocks abruptly detach from a steep slope or cliff ,the materials can be as large as boulders that are thousands cubic meter, or small clumps of rock and soil.
- Topple- similar to a domain falling down when it is resting on the narrow edge, or a loaf of bread that is being sliced on its width. The blocked rotates outward from the slope often due to heaviness of the materials specially during rainy season
- Slide- the material made up of a rock or soil mass has a download slope movement, and is separated from more stable underlying material. The horizontal layer where the slide material is detached from the underlying materials is the distinct zone of weakness or surface rupture.
- Rotational Slide- the surface is curved concavely upward and slide movement roughly rotates about an axis that is parallel to the ground surface and transverse across the slide.
- Translational slide- the type of slide wherein the landslide mass moves along a rough planar surface with almost no rotation or backward tilting.
- Spread- a landslide is the spread, which is an example of a landslide often caused by soil liquefaction or the general subsidence of a fractured rock or soil mass into a softer underlying material.
- Flow- the continuous movement of displaced mass, resembling a viscous liquid.

Sinkholes

- Describe to be dramatic
- Sudden collapse of the land can occur
- Some hold water and build natural ponds

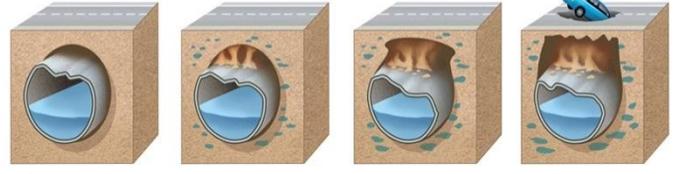
NATURAL



1. Water percolating into bedrock near ground level slowly erodes soluble rock such as limestone or dolomite, creating small cavities.
2. The soil on top of the bedrock, known as overburden, is composed largely of sand, silt or clay. In a process called suffusion, it starts to fall into cavities in the bedrock.
3. As this soil fills spaces in the bedrock below, a new cavity forms in the overburden, expanding toward the surface.
4. In weak soil, the cavity grows quickly in the shape of a funnel. In stiffer soil, such as clay, the cavity eventually becomes so large that the remaining overburden can no longer support itself or the weight of objects on the ground above it, and the overburden collapses, creating a sinkhole.

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HUMAN-MADE



1. Infrastructure such as sewer pipes or water mains, located below loose deposits of earth, collapse as a result of erosion or age.
2. The loose earth fills the space created by the collapsed pipe and, in some cases, water from the pipe permeates the ground around it, weakening the surrounding soil.
3. A cavity remains above the collapse, and expands upward to the surface.
4. If sediments are very loose, a funnel-shaped sinkhole can occur quickly. But if there is a solid layer of material such as asphalt or concrete on the surface, the cavity below can remain concealed even as it grows. Once the weight becomes too much to bear, the cover collapses, and a more dangerous cylindrical sinkhole is formed.

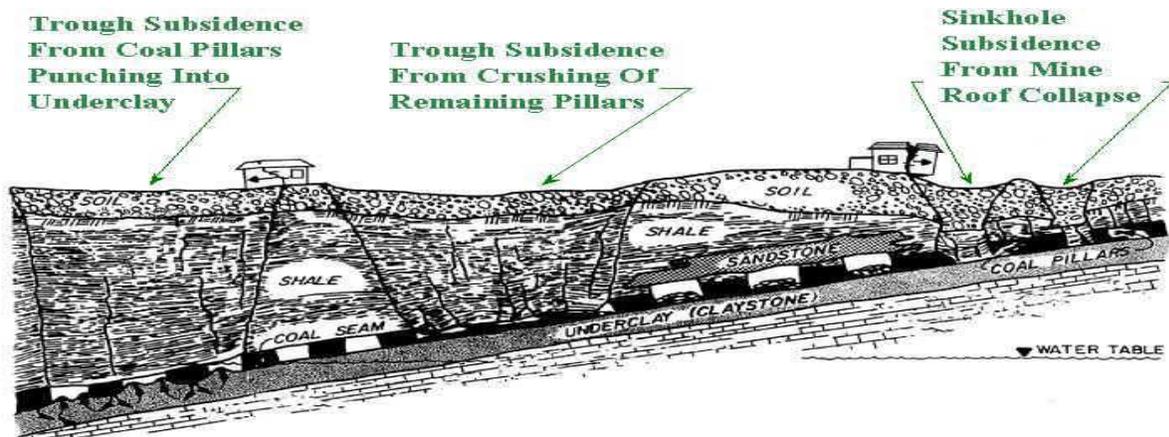
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2. Gradual Geologic Hazard

Subsidence

- The motion of the surface as it shift downward, relative to reference point such as sea level.
- It attributed to the creation of sinkholes.

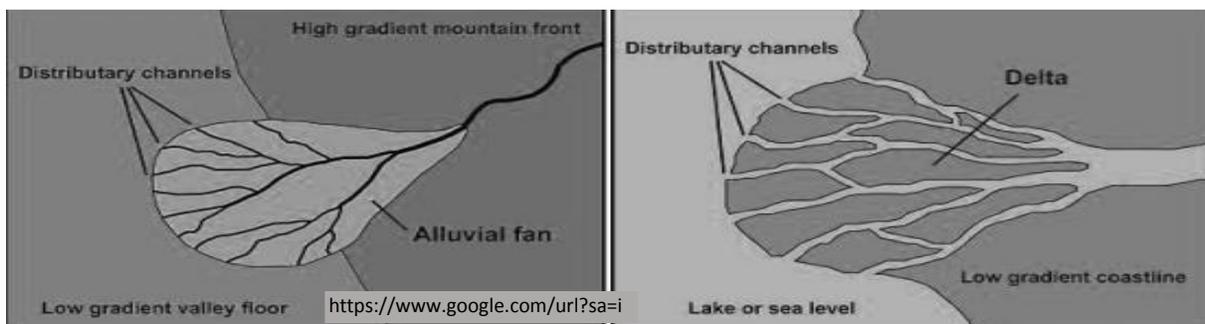
MODES OF SUBSIDENCE



Modified From Bruhn, Et Al, 1978

Alluvial fan

- Fan or cone shaped deposit of sediment crossed and created by streams
- It is made up of gravel, sand, and even smaller pieces of sediment, such as silt which is called alluvium. (NGS)
- It is created by flowing water interacts with mountains, hill, or the steep wall of canyons (NGS)



<https://www.google.com/url?sa=i>

Natural Causes Of Landslide

- Ground water
- Loss or absence of vertical vegetative structure, soil nutrients, and soil structure
- Earthquakes
- Volcanic eruption

Human Causes Landslide

- Removal of vegetation
- Leaking pipes such as those for water and sewer
- Modification of slope by construction of roads, railways, and buildings
- Vibration from heavy traffic, blasting ,etc
- Overlapping slopes
- Mining and quarrying activities
- Excavation or displacement of rocks

Signs Of Impending Geological Hazards

- Earlier landslides as an indicator
- Tension Cracks
- Different water movements



LA IMMACULADA CONCEPCION SCHOOL
SENIOR HIGH SCHOOL
GRADE 11 – STEM: DISASTER READINESS AND RISK REDUCTION

ACTIVITY 1
LIFE'S CHOICES

Workshop

Safety First! Make info graphic about the things that you should do to prepare for geologic hazard of your choice. Plot your info graphic as before, during and after the geologic hazard



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ACTIVITY 2 OTHER GEOLOGIC HAZARDS

Read the following scenario and formulate at least four questions and discuss the answer using the concept learned in the supplementary lesson. (20 points)

Three friends (Yuan, Bella and Ann) live in the small city of Paradiso, which is located in a beautiful mountain valley. The bottom of the valley has a small river running through it. The walls of the valley have land that includes forests and farms. The friends have lived there since they were young and they know that earthquakes sometimes happen there. They have only felt one small earthquake, but their parents and grandparents have told stories about some strong earthquakes that have happened in the area. Sometimes, during extreme weather like heavy rain, the road that comes into Paradiso from a nearby city is closed because rocks have fallen on the road or the road has washed away.

Yuan and Bella live next to each other on farms located on slopes in the valley. Yuan's farm used to have a natural spring at a crack between two rocks that produced drinking water for both Yuan's and Bella's families, but the spring stopped producing water about a year ago. Recently, a neighbour has started complaining that some parts of his land have become very soggy and soaked with water, especially near the bottom of the valley.