



WAVES

सामुद्रिक तरंग/लहर

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INTRODUCTION

- A wave is any disturbance created when energy moves through an object or substance.
- There are many types of waves caused by different forces – some examples are earthquakes, ocean waves, radio waves, visible light waves, and atmospheric waves.
- Tide, alternate and regular rise and fall of sea level in oceans and other large bodies of water.
- These changes are caused by the gravitational attraction of the moon and, to a lesser extent, of the sun on the earth.

WAVES

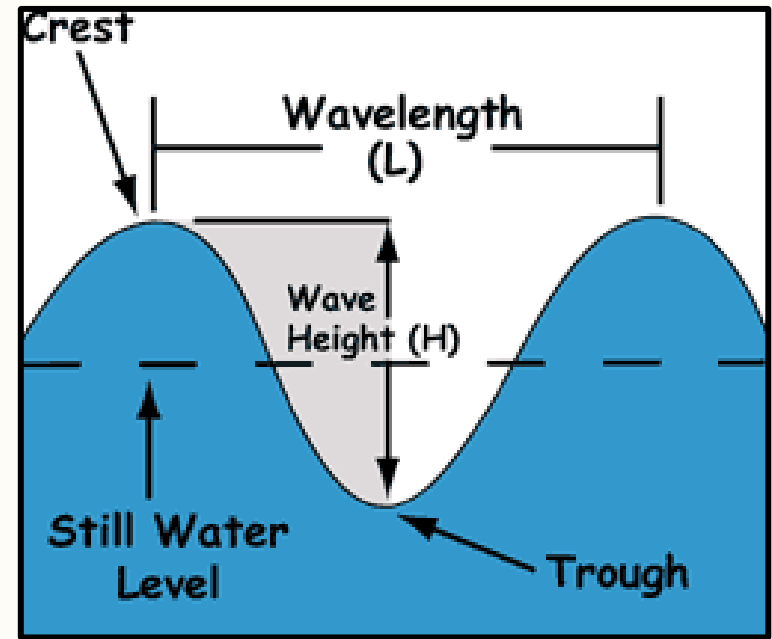
- A disturbance on the surface of water, caused by the rhythmic movement of water particles due to the action of winds.
- The height of the wave depends on the speed of the wind.
- A tsunami is a very long wave caused by submarine or coastal earthquakes, landslide or volcanic eruption.



WAVE CHARACTERISTICS

Parts of a Wave

- λ Crest = high point
- λ Trough = low point
- λ Height = vertical distance from crest to trough
- λ Wavelength = Horizontal distance between crest to crest or trough to trough

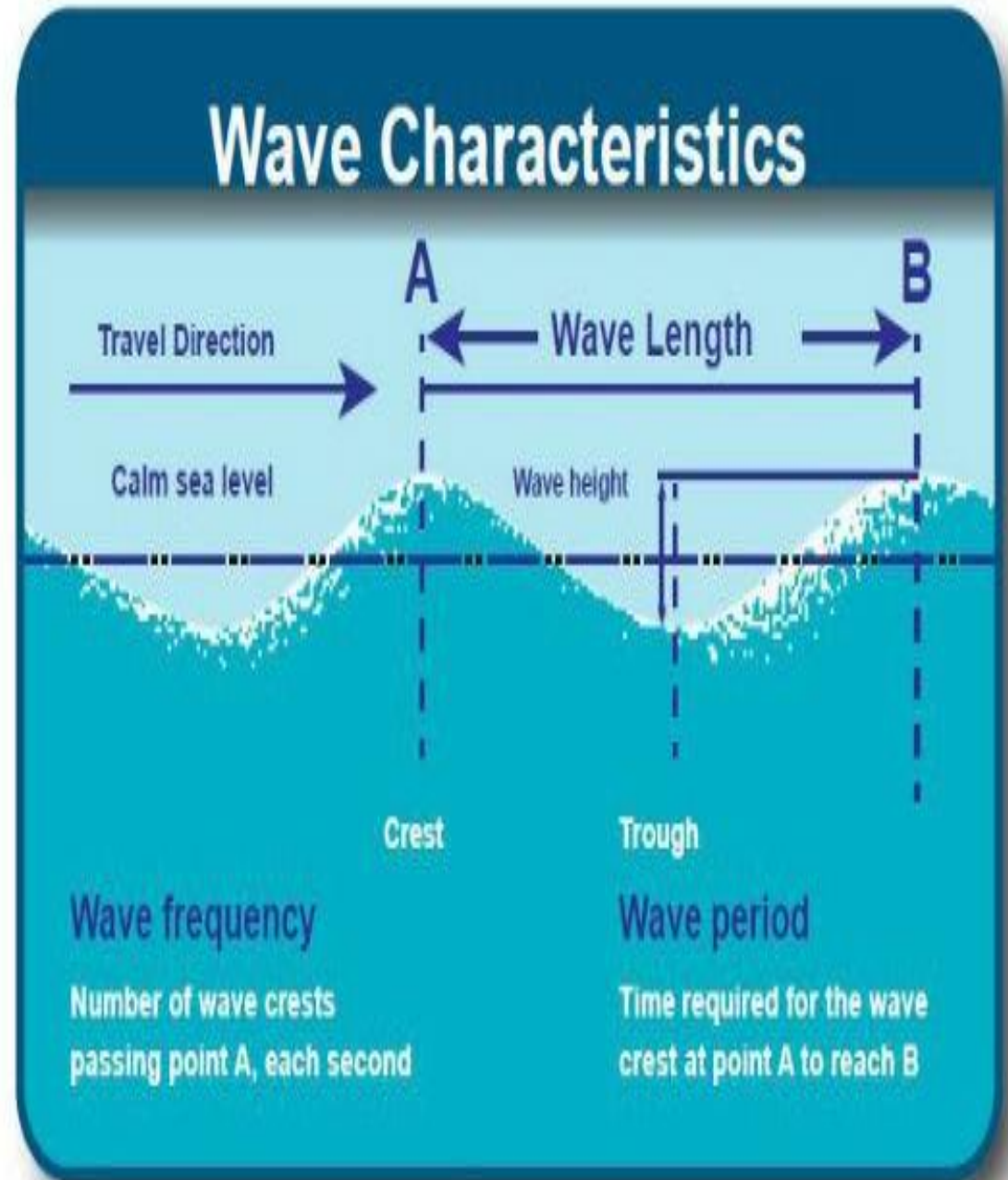


Wave period : time
for 2 crests to pass
fixed point (T) sec

Wave speed (C) : $C =$
wavelength / T (m/s)

Wave steepness : $H /$
wavelength

When $H /$
wavelength = $1/7$ or
angle at crest 120 or
less = **Breaker**



SIZE OF WIND GENERATED WAVES

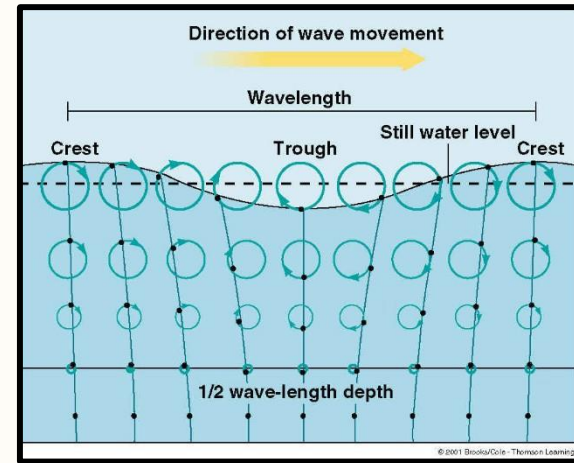
- Depends on 3 things:
 - λ Wind Speed
 - λ Wind Duration
(length of time wind blows)
 - λ “Fetch” Extent of open water across which the wind can blow



WATER MOTION IN WAVES

Water travels in vertical circular orbits

Wave moves, particles don't!

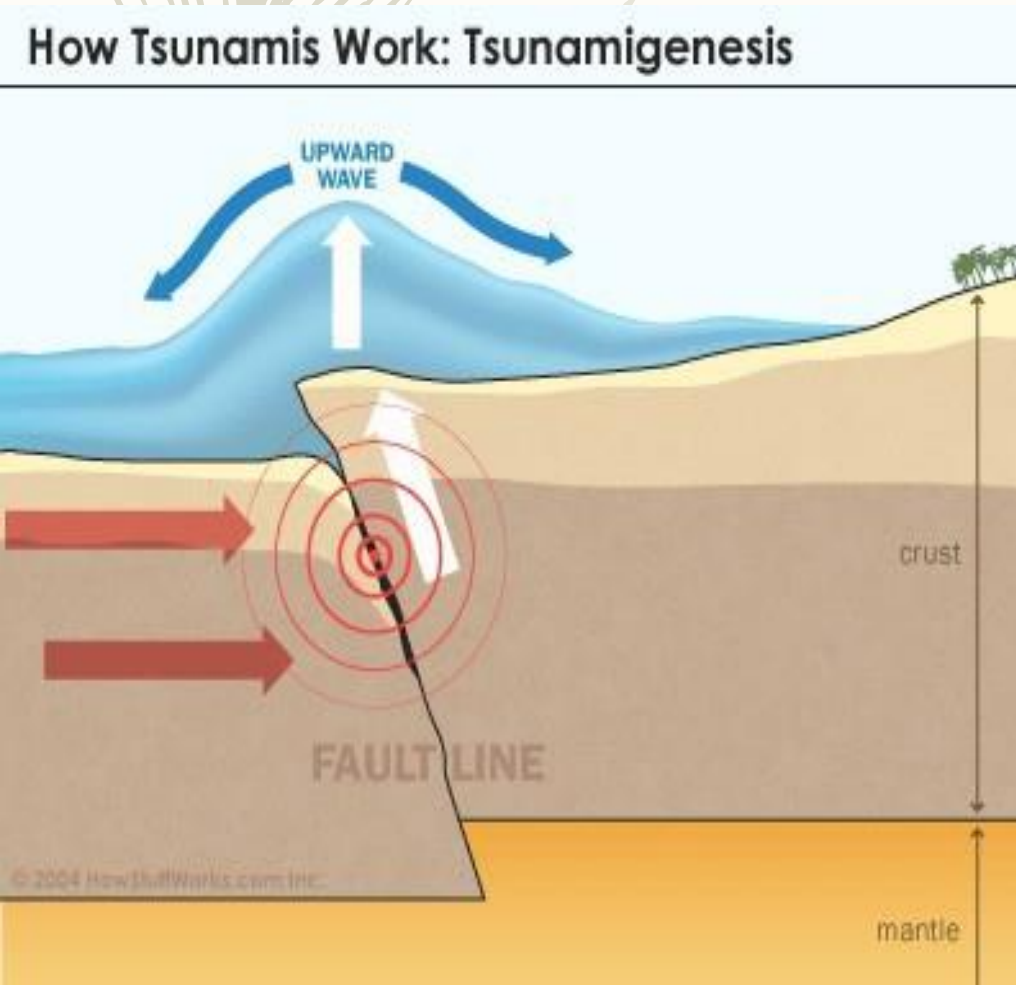


TYPES OF WAVES

Type of Wave	Period	Wavelength	Depth of influence	Source
Capillary or ripple	< 1 second	< 2 cm	Very shallow	Light wind, insects
Chop	1-10 seconds	1-10 m	Shallow	Strong wind
Swell	10-30 seconds	up to 100 m	$\frac{1}{2}$ of the wavelength	Storms
Tsunami	5-90 minutes	20 km to 300+ km	To the bottom	Earthquakes, Landslides, Volcanic eruptions, and more

Tsunami Waves

A tsunami also known as a seismic sea wave, is a series of waves in a water body caused by the displacement of a large volume of water, generally in an ocean or a large lake.



Caused by undersea quake or volcano

Wavelength = ~150 mi.

Wave height = 6" – 1'

Can NOT perceive in boat

Speed > 500 mph

Slows down to ~25 mph at shore; water builds up to ~65+ ft



THANK YOU

Any Question
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