Mechanism of Earth Plate motion
(Driving force of continental drift)

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Index

Introduction

I suggest a mechanism for the force that moves continents.
This force is 'ridge push by Plate Tide lever working'.
This force, which moves the plates of the Earth, This is the same force that splits Supercontinents, spreaing seafloor, and forms giant mountain ranges.The source of this force is the Earth plate tide by Moon and Sun. Earth plate fatigue failure by continuous tidal force. The cause of Continental drifting and Sea floor spreading is Earth plate tide and ridge push lever effect work.

1. Ocean Tides

The Earth's Ocean tides are a complex result of the gravitational forces of the Moon and the Sun. For convenience, I will describe them as resulting from the gravitational force of the Moon.

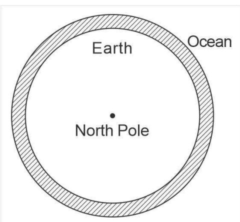


Fig1 Zero Ocean tide

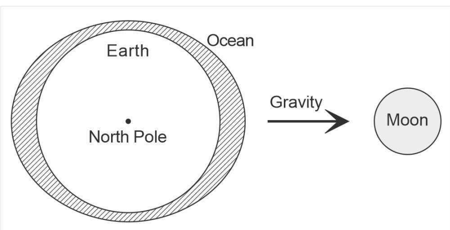


Fig2 High Ocean tide (top view)

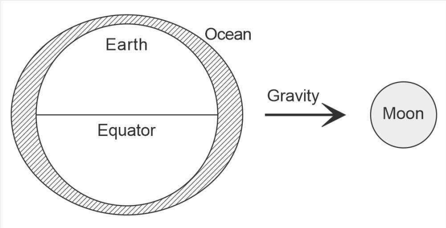


Fig3 High Ocean tide (side view)

2. Earth tide

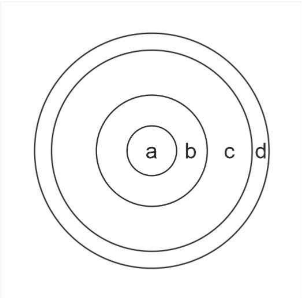


Fig4 Zero Earth tide

a: Inner core b: Outter core c: Mantle d: Plate

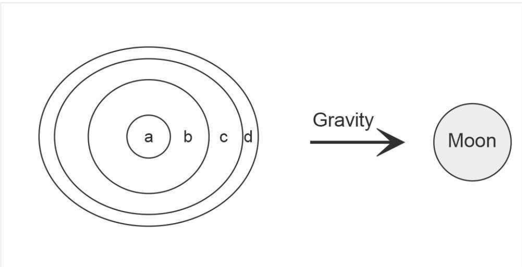


Fig5 High Earth tide

a: Inner core b: Outter core c: Mantle d: Plate

3. Tide of Earth interior

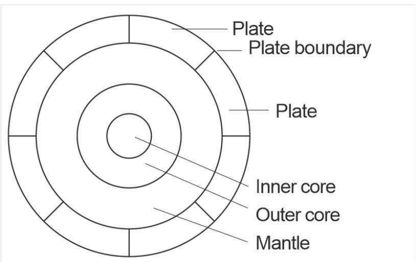


Fig6 Zero Earth tide

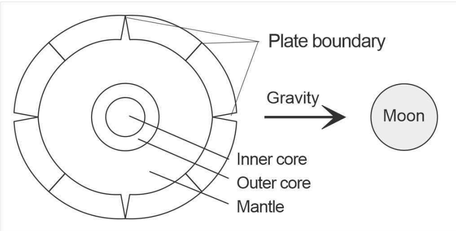


Fig7 High Earth tide

4.Variation of Plate Boundary by Earth Rotation

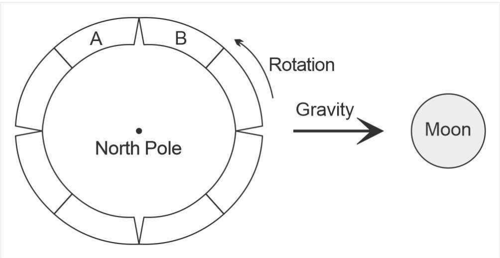


Fig8 Earth Rotation

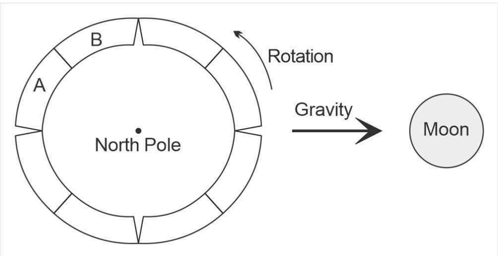


Fig9 Earth Rotation

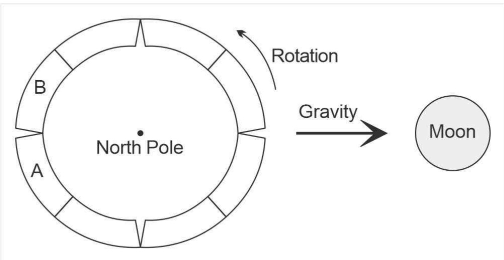


Fig10 Earth Rotation

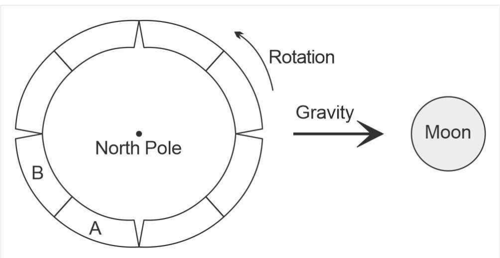


Fig11 Earth Rotation

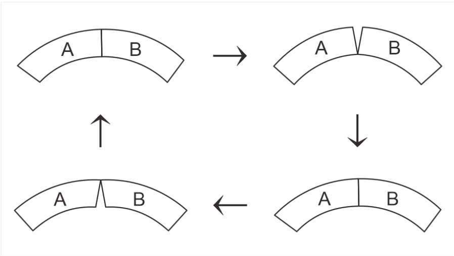


Fig12 Variation cycle of plate boundary by Earth's rotation

5.Mechanism of continental separation,ridge formation and seafloor spreading

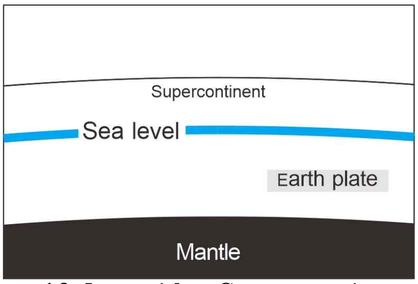


Fig13 **Low tide**. Supercontinent.

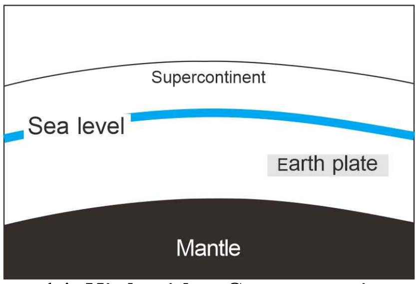


Fig14 **High tide**. Supercontinent upper tension.

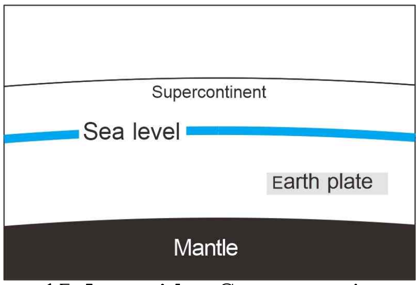


Fig15 **Low tide**. Supercontinent lower tension.

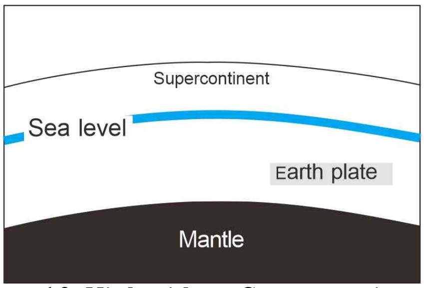


Fig16 **High tide**. Supercontinent upper tension, Increase fatigue.

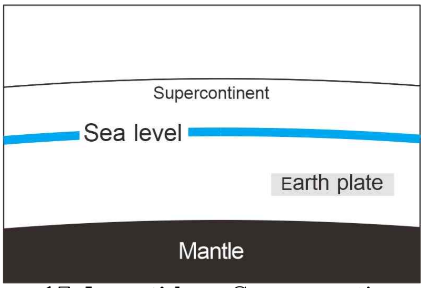


Fig17 **Low tide**. Supercontinent lower tension, Increase fatigue.

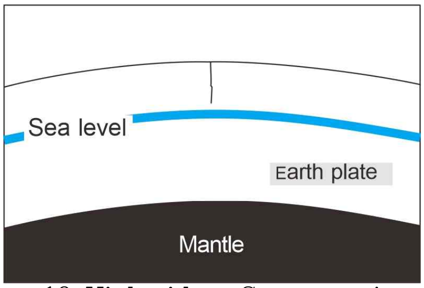


Fig18 **High tide**. Supercontinent surface crack, Start fatigue failure.

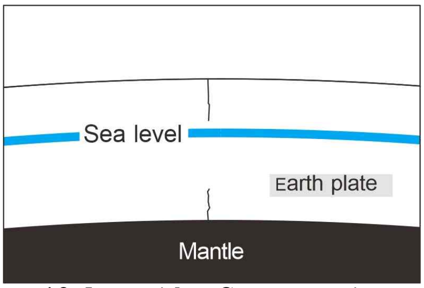


Fig19 **Low tide**. Supercontinent lower crack.

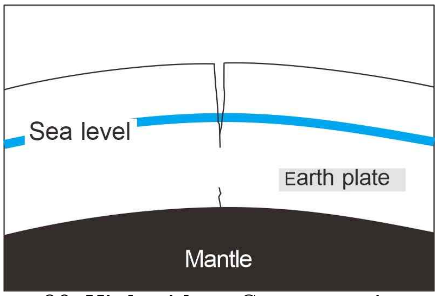


Fig20 **High tide**. Supercontinent upper crack increase.

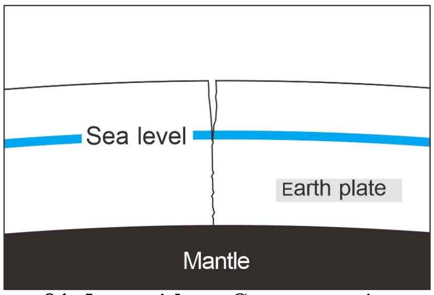


Fig21 **Low tide**. Supercontinent lower crack increase.

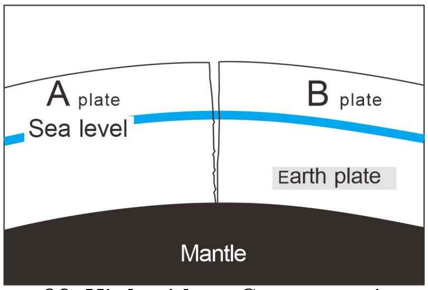


Fig22 **High tide**. Supercontinent upper crack increase,Earth Plate separation

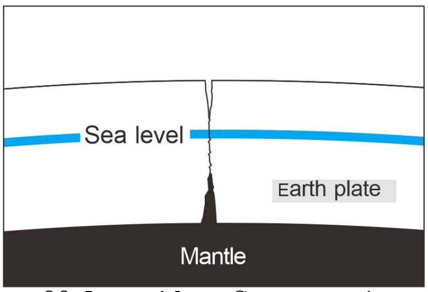


Fig23 **Low tide**. Supercontinent lower magma intake,Formation Plate boundary

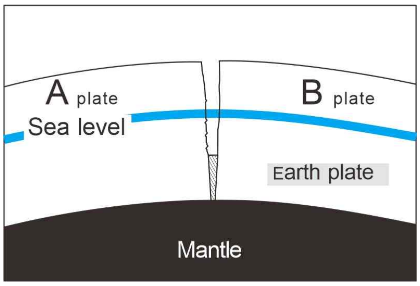


Fig24 High tide. Magma cooling

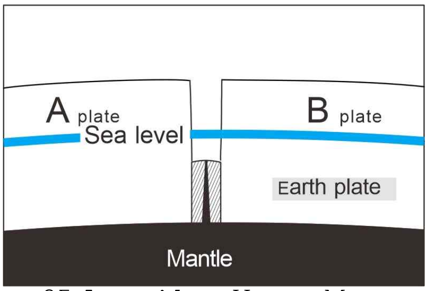


Fig25 Low tide. Upper Magma intake, Formation sea

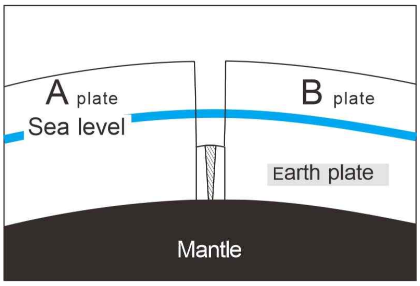


Fig26 High tide. Rising magma in Plate boundary, Magma cooling

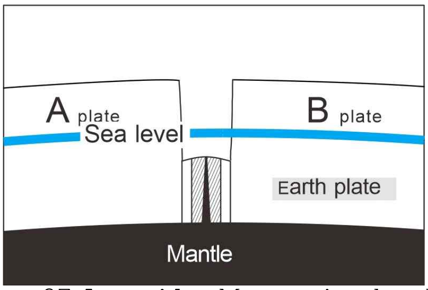


Fig27 Low tide. Magma intake, Rising magma in Plate boundary, Formation seafloor

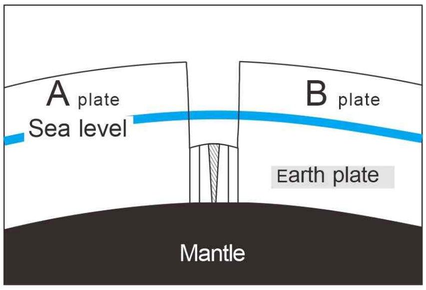


Fig28 **High tide.** Rising magma in Plate boundary, Magma cooling, Seafloor spreading.

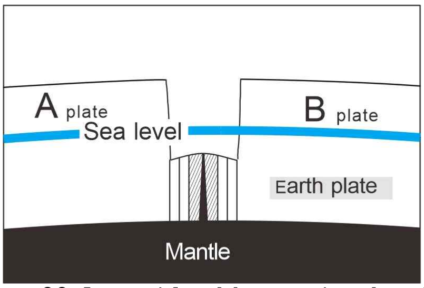


Fig29 **Low tide.** Magma intake, Rising magma in Plate boundary

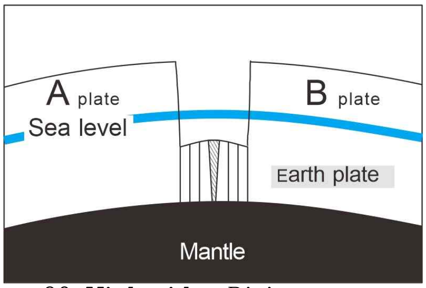


Fig30 **High tide.** Rising magma in Plate boundary, Magma cooling, Seafloor spreading

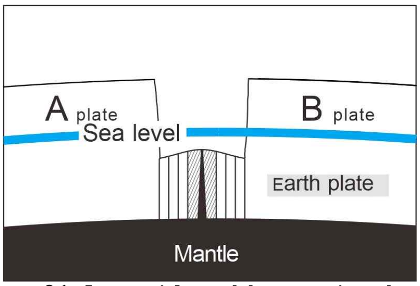


Fig31 **Low tide.** Magma intake, Rising magma in Plate boundary

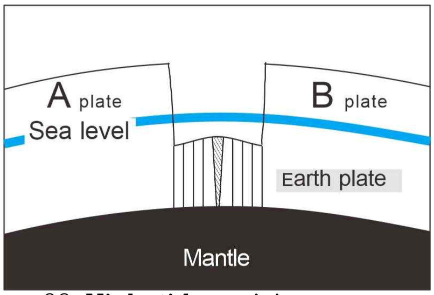


Fig32 **High tide.** rising magma in Plate boundary, Magma cooling, Seafloor spreading

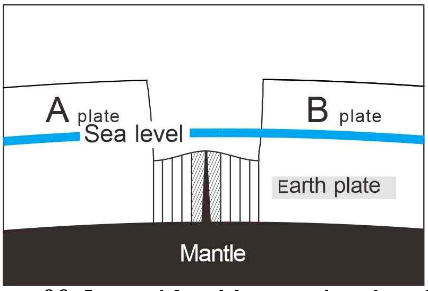


Fig33 **Low tide**, Magma intake, Rising magma in Plate boundary

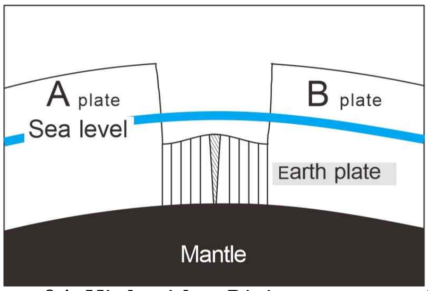


Fig34 **High tide**, Rising magma in Plate boundary, Magma cooling, Seafloor spreading

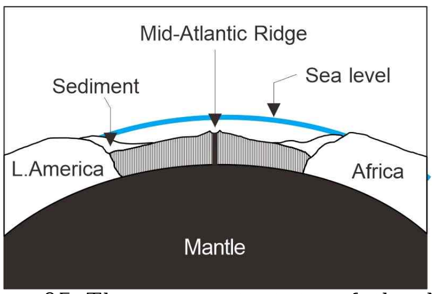


Fig35 The current state of the Mid-Atlantic Ocean Ridge area

6.Earth Plate lever working mechanism by tidal force

6-1. Lever working

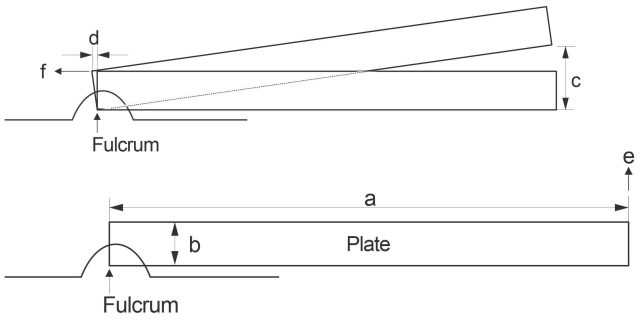


Fig36 lever working by each part

a. Lever width : Width of the Plate(Continent)

b. Lever thickness : Thickness of the Plate

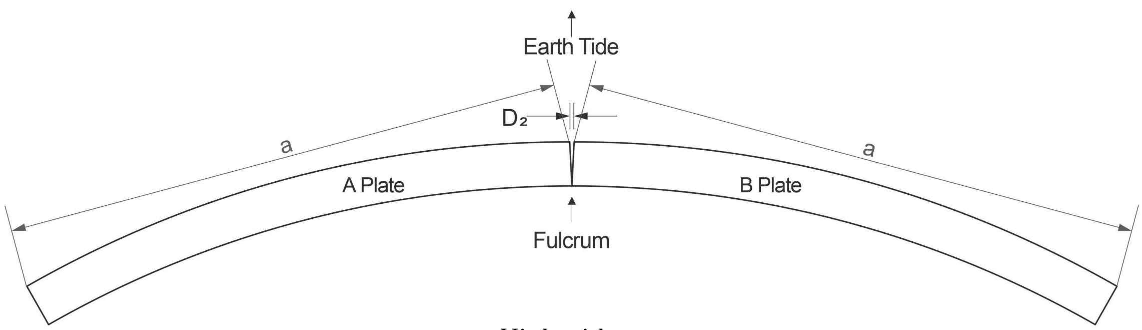
c. Moving distance : Average height of Earth tide(250mm)

d. Loading distance : Plate push distance

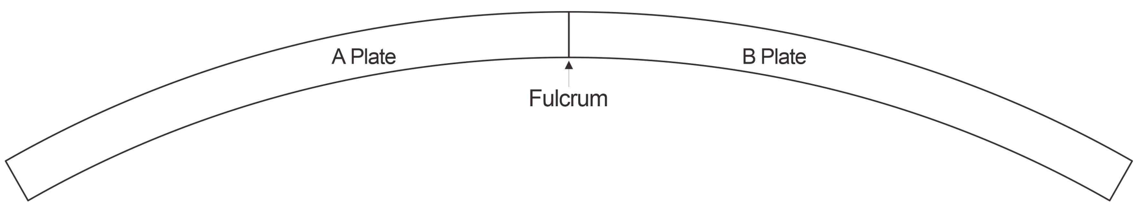
e. Effort : Pull force by tide

f. Load : Ridge push force by Earth plate lever work

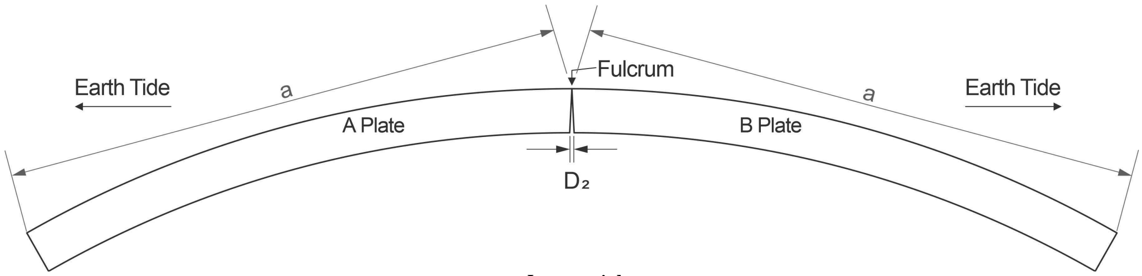
6-2. Earth Plate lever working by tidal force



<High tide>



<Medium tide>



<Low tide>

Fig37 Earth plate lever working cycle by tidal force

a. Width of the Plate(Continent)
b. Thickness of the Plate
c. Average height of Earth tide(250mm)
d. Plate push length
e. Pull force by tide
f. Ridge push force by Earth plate lever work

7. The speed of moving continent and amplification of force

7-1 D2 at the time of Supercontinent separation

a=4000km,b=7km,c=250mm,d=0.437mm
a:b=4000km:7km = 571:1
a:b=c:d=250mm:0.43mm
D2=0.86mm/time
1day=2time=1.72mm
1year=628mm

7-2 D2 at current

a=6500km,b=7km,c=250mm,d= 0.2mm
a:b=6500km:7km=929:1
a:b=c:d=250mm:0.27mm
D2=0.54mm/time
1day=2time =1.08mm
1year=394mm

7-3 At the time of supercontinent separation the force of tide lever ridge push

tide force c=1 then f=571time

7-4 Current the force of tide lever ridge push

tide force c=1 therefore f=929time

Conclusion

*Depending on the values of a(width of the plate) and b (thickness of the oceanic crust),slightly different results may be obtained,but the ridge push force is amplified sufficiently by the tide lever effect, at least 500times and over 1000 times, so it becomes strong enough to split continent and move continents.

*The tide gap (D2) between the two Continents A and B is calculated to be an average of 1.4mm/day (0.408m/yr), by substituting the thickness of the oceanic crust and the width of the continent into the above conditions. Assuming that the two continents A and B are moving away from each other at this speed and substituting the width of the Atlantic Ocean, 5000km, The crack of the continent (Gondwana) is only 12.5 ma, so the speed of continental drift is too fast. 12.5ma is 1/18 of the age of the Atlantic Ocean(230 ma).
This is interpreted as a decrease in the speed and distance of the continents moving away from each other to 1/18, due to various variables such as resistance (drag) of the continent, elasticity of the continental crust, viscosity of magma, delay due to the revolution of the Moon, cancellation of tides by the Sun, movement of the axis of Earth's rotation, and the variaty tidal force by latitude

*It is expected that D2 can be measured at intervals of 12 hours in the AFAR Depression (Great Rift Valley) and a range of 1/10mm to 1/100mm/cycle is proposed due to various variables.

*For the magma rising to the seafloor to cool and solidify, it must rise to a higher position than the already created oceanic crust. Therefore, the sea floor gradually rises towards the ridge side.

*In the early stages of the formation of the sea floor, the resistance of the Continent was low and the width (a) of the plate was smaller than it is now, so it is speculated that the sea floor spreading rate was faster than it is now.

Refrence

Alfred Wegener, (1915). Die Entstehung der Kontinente und Ozeane
Hess, H. H. (November 1962). "History of Ocean Basins“
Dietz, Robert S. (1961). "Continent and Ocean Basin Evolution by Spreading of the Sea Floor"