Driving Force of Earth Plate Motion

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Abstract

I suggest that the source of this force is the Earth tides, specifically the Tide lever crack and Tide lever push work.

Introduction

I suggest a new mechanism for the force that moves continents. This force, which moves the plates of the Earth, is the same force that splits Supercontinents, creates oceans, and forms giant mountain ranges.

I suggest that the source of this force is the Earth tides, specifically the Tide lever crack and Tide lever push 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.“

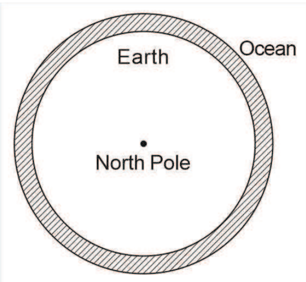


Fig1 Zero ocean tide.

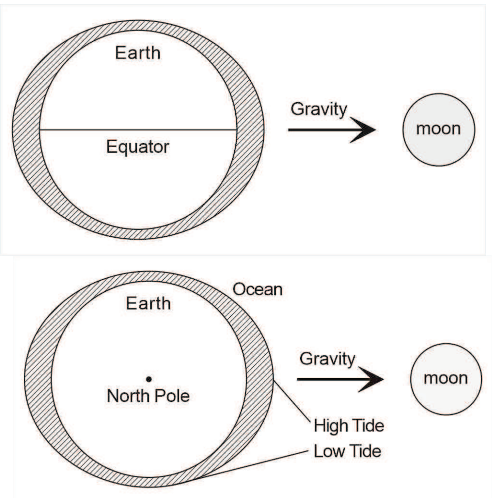
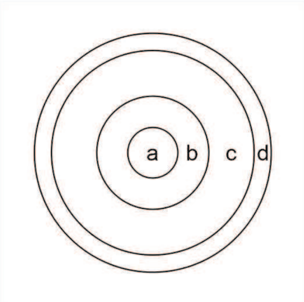


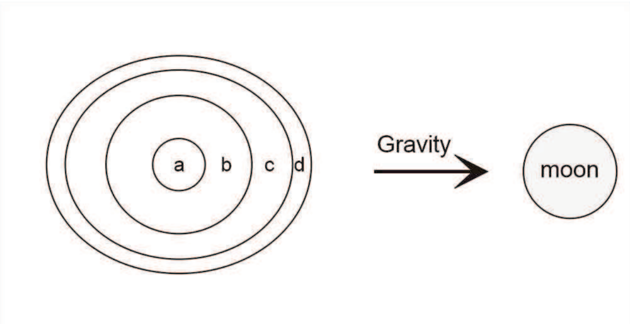
Fig2 High ocean tide,

2. Earth Tide



a:inner core,b:outter core,c:mantle,d:plate

Fig3 Zero Earth tide



a:inner core,b:outter core,c:mantle,d:plate

Fig4 High Earth tide

3. Tide of Earth interior

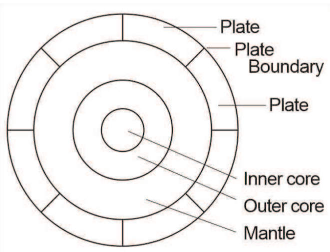


Fig5 Zero Earth tide

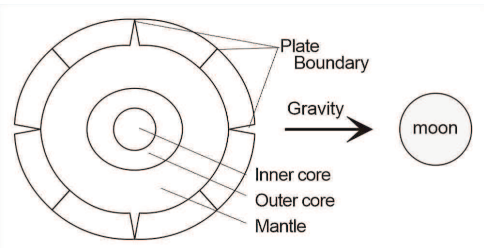


Fig6 High Earth tide

4.Variation of plate boundary by Earth rotation

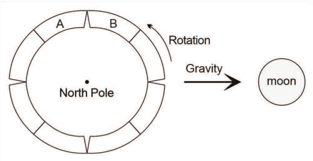


Fig7 Earth rotation

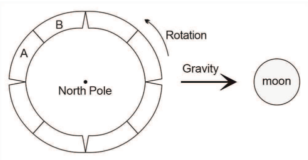


Fig8 Earth rotation

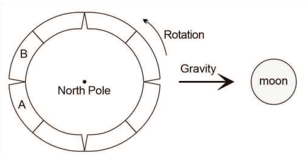


Fig9 Earth rotation

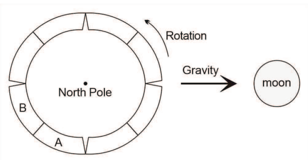


Fig10 Earth rotation

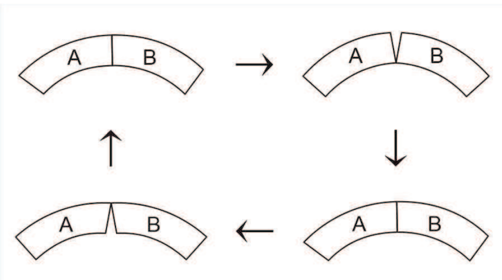


Fig11 Varition of plate boundary cycle by Tide,Rotation

5.Mechanism of formation Ocean ridge and seafloor spreading

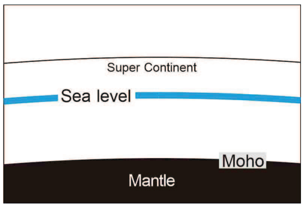


Fig12 Low tide,Supercontinent.

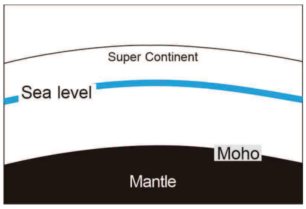


Fig13 High tide,Supercontinent upper tension.

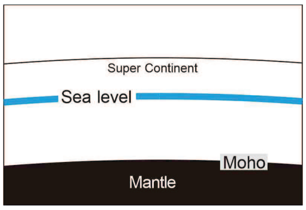


Fig14 Low tide,Supercontinent lower tension.

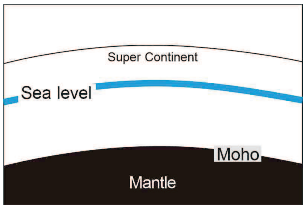


Fig15 High tide,Supercontinent upper tension,Increase fatigue.

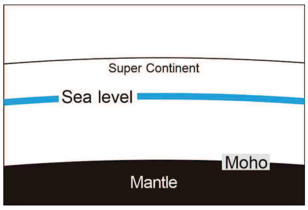


Fig16 Low tide,Supercontinent lower tension,Increase fatigue.

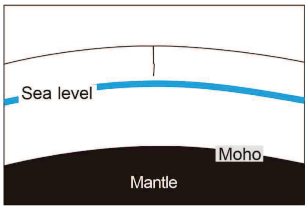


Fig17 High tide,Supercontinent surface crack,Start fatigue failure.

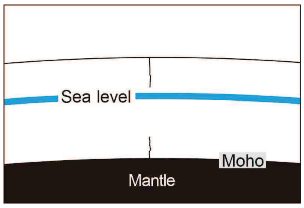


Fig18 Low tide,Supercontinent lower crack.

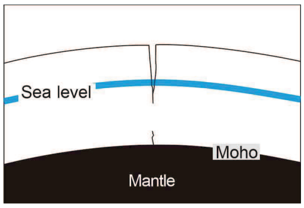


Fig19 High tide,Supercontinent upper crack increase.

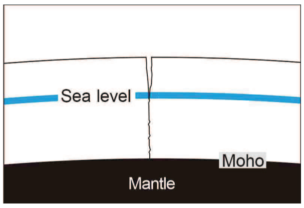


Fig20 Low tide,supercontinent lower crack increase.

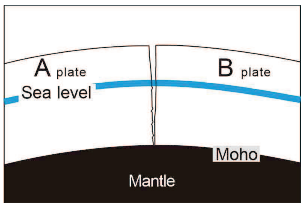


Fig21 High tide,Supercontinent upper crack increase,Earth plate separation.

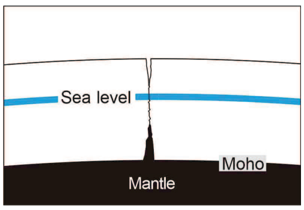


Fig22 Low tide,Supercontinent lower magma intake,Formation plate boundary.

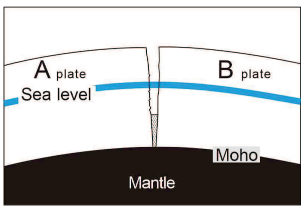


Fig23 High tide, Magma cooling.

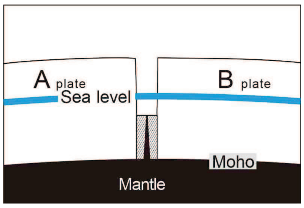


Fig24 Low tide,Magma intake,Formation sea,

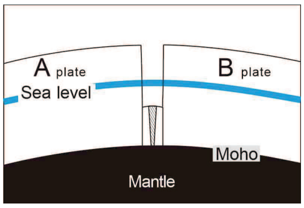


Fig25 High tide.Rising magma in plate boundary, Magma cooling.

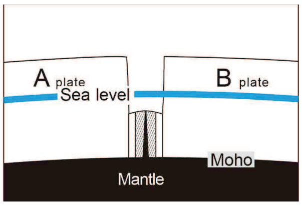


Fig26 Low tide,Magma intake.Rising magma in plate boundary,Formation seafloor.

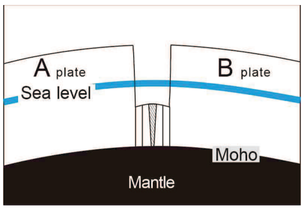


Fig27 High tide,Rising magma in plate boundary, Magma cooling.Seafloor spreading.

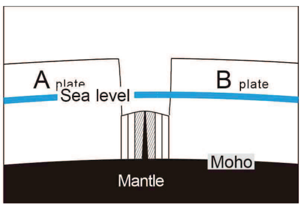


Fig28 Low tide,Magma intake,Rising magma in plate boundary.

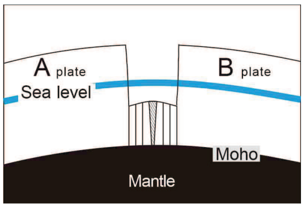


Fig29 High tide,Rising magma in plate boundary,Magma cooling,Seafloor spreading.

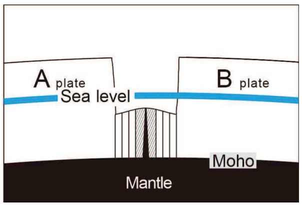


Fig30 Low tide,Magma intake,Rising magma in plate boundary.

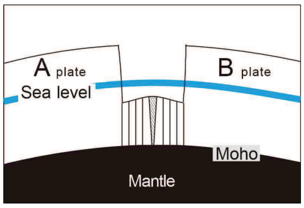


Fig31 High tide,rising magma in plate boundary,Magma cooling,Seafloor spreading.

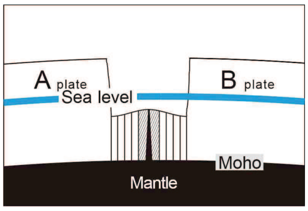


Fig32 Low tide,Magma intake,Rising magma in plate boundary.

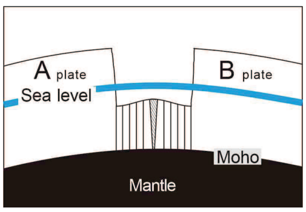


Fig33 High tide, Rising magma in plate boundary,Magma cooling,Seafloor spreading

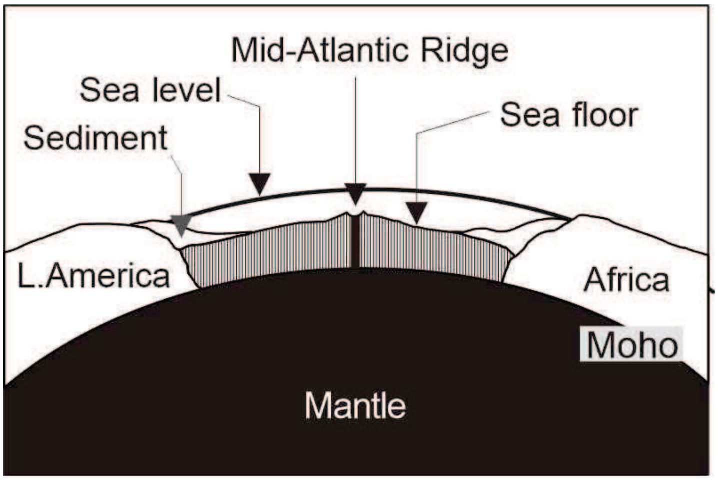
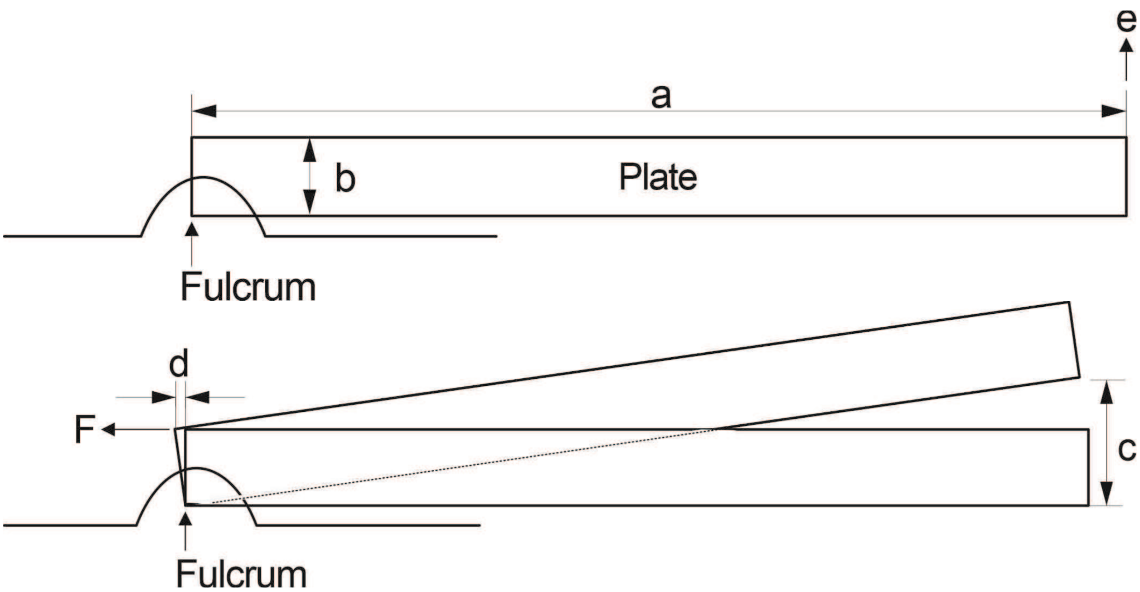
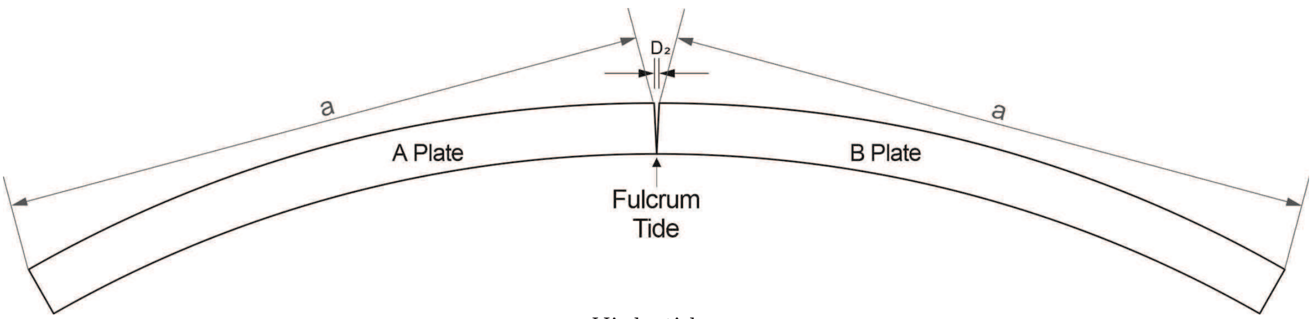


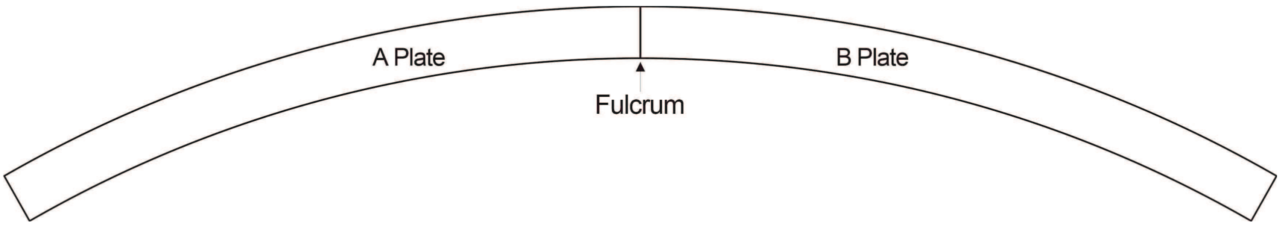
Fig34 The current state of the Mid-Atlantic Ocean Ridge area

6.Plate lever working mechanism

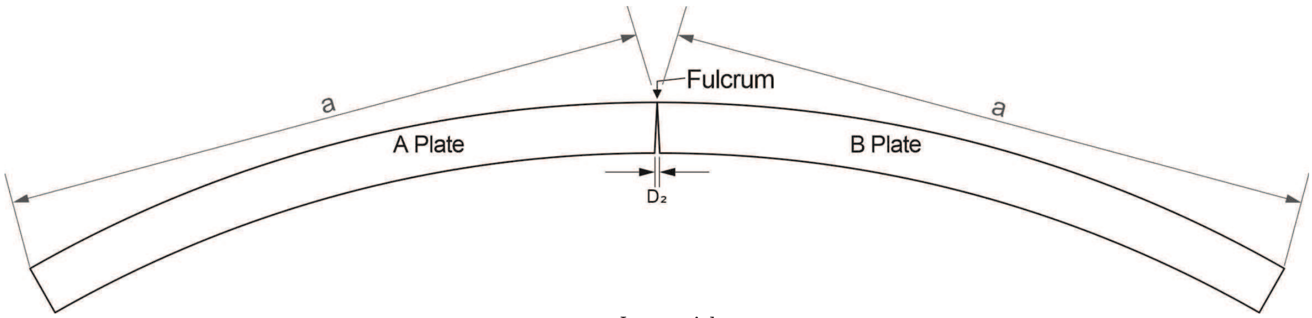




<High tide>



<Medium tide>



<Low tide>

Fig35 Plate lever working mechanism

a:width of the continent

b:thickness of the plate

c:height of earth tide 25cm(10cm~50cm)

d:plate push length

e:pull force by tide

f:plate push force by lever work

7. The speed of Continental drift and Amplification of force

7-1 d2 at the time of supercontinent crack

a=4000km

b=7km

a:b=4000km:7km = 571:1

a:b=c:d

c=250mm(100~500mm by latitude)

d=0.437mm

d2=0.87mm/cycle

1day(2cycle)=1.75mm

638mm/yr

7-2 d2 at current

a=6500km.

b=5km

a:b=c:d=1300:1

c=250mm(100~500mm by latitude)

d= 0.2mm
d2=0.4mm
1day(2cycle)0.8mm/
292mm/yr

7-3 At the time of continental rift the force of plate ridge push
if tide force c=1 then F(ridge push force by lever work)=571time

7-4 Current the force of plate ridge push
if tide force c=1 then F(ridge push force by lever work)=1300time

8.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 1300 times, so it becomes strong enough to split 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 seafloor gradually rises towards the ridge side.

*In the early stages of the formation of the seafloor, the resistance of the continent was low, the elasticity of the continent was greater than it is today, and the width (a) of the plate was smaller than it is now, so it is speculated that the seafloor spreading rate was faster than it is now.

*Table type mountain, which is mainly distributed along the eastern coast of Latin America and the western coast of Africa, is interpreted as a trace of cracks on the Supercontinent(Gondwana).

refrence

Continental drift theory.Alfred Wegener, (1915). Die Entstehung der Kontinente und Ozeane

https://en.wikipedia.org/wiki/Earth_tide

Mantle convection theory.Arthur Holmes (1929)

Seafloor spreading,ridge push theory.Harry Hess, Dietz, (1962)