Japan Geoscience Union Meeting 2015
(May 24th - 28th at Makuhari, Chiba, Japan)

SGD21-P03 Room:Convention Hall Time:May 27 18:15-19:30

The formation of equatorial flattening of the Earth

KAKUTA, Chuichi[1*]

[1]none

The supercontinent Pangea is formed 330 Ma ago and followed with a sequence of breakup after 100 My. During the supercontinent Pangea occuured, the mantle convection of very long-wavelengths at spherical harmonic degree-1.After the African continent is formed a degree-2 structure,the Africa and Pacific superplumes show major upwellings(Zhong et.al.,2007;Zhang et al.,2010).The degree-2 structure for the present-day mantle with the Africa and Pacific superplumes is shown as the equatorial flattening of the present Earth. The evolution from the degree -1 to the degree-2 is due to change of the convective flows from a downwelling to a upwelling under the Pangea supercoontinent.Here we attempt to explain the formation of the equatorial flatterning by considering that chemical diffusion of a light element FeO compared with Fe into the OC(outer core) from the IC(inner core) through the ICB(inner core -outer core boundary)and from the mantle through the CMB(core-mantle boundary) respectively in the eastern hemisphere (40 deg.E-180 deg.E).Mass loss of the degree-1 in the mantle and the IC causes anisotropic mass distributions relative to the center of the Earth's gravity. The center of gravity of the mantle and the IC shift towards the western hemisphere(180 deg.W-40 deg.E).These shifts induce additional modes of Y221 to the Earth's geopotential. The fluid OC keeps an axially symmetric form. The Earth has an equatorial flattening form for a long time.The rotational speed of the mantle will be increase,but the rotational speed of the IC and OC will be decrease because of the radius of the IC increases and mass inflow from the mantle repectively.The thermal stable stratification near the CMB and the ICB increases thermal transport to the mantle.

Keywords: Pangea supercontinent, Africa continent, FeO diffusion, Earth's equatorial flattening, rotational speed, thermal transport