

The Geoid High and Temperature Variations near the CMB

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Anderson(1982)showed that the 40m geoid high near the African super plume after the Pangea supercontinent formation(330 Ma),and suggests upwelling heat flow under the African super plume. Heat flow flux in the mantle relates to Joule heating in the Earth and the inner core growth. The age of the inner core is studied to be 2.7 Ga(Hale,1987;Kumazawa et al.,1994).But Labrosse et al.(2001) pointed out that the age of the inner core is most likely around 1 Ga. It is interesting that both ages of formation of the seismic anisotropy layer 235 km and 375 km in the inner core from the ICB (inner core boundary) and the African supercontinent formation may be close each other, if the inner core age is young. In this report the effects of heat flux from the CMB(core mantle boundary) on the African geoid high are studied. This problem has been reported that periodic supercontinent cycles are unlikely if thermal instabilities originating at the CMB are of sufficient strength (Phillips and Bunge,2001).Here,however,we revisit this problem in consideration of the inner core growth. Effects of variations of heat flux from the CMB on the mantle geoid high are small,but heat flow changes rapidly depending on the rate of decay ($1/e$ decay),that is changes of convective patterns.The rate of decay,which consists with the geoid high as shown by Anderson (1982),is about $1/500$ km.

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