Press Releases

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JAMSTEC

New Supercontinent “Amasia” Could be Formed in Northern Hemisphere Within ca. 250 Million Years

- Significant advancement in understanding what drives continental drift -

Overview

A series of high-resolution numerical simulations of three-dimensional mantle convection performed by Dr. Masaki Yoshida, a scientist at Department of Deep Earth Structure and Dynamics Research, the Japan Agency for Marine-Earth Science and Technology (JAMSTEC: Asahiko Taira, President) revealed that Australia, Eurasia, North America, and Africa will merge together in the Northern Hemisphere to form a new supercontinent "Amasia"[*1] within ca. 250 million years from the present.

Since the beginning of 1990, the birth of the supercontinent has been suggested based on the current plate motion and geological assessments. Using a unique approach that can reproduce the continental drift on the real Earth, these simulations confirmed the birth of Amasia with clarification of the formation mechanism. In addition, it also presented that the Japanese islands could be part of the new supercontinent, being sandwiched between Eurasia remaining in the Northern Hemisphere and Australia heading north toward at high speed from the Southern Hemisphere.

These findings are expected to contribute to significant improvement in better understanding of plate motions, the behavior of the continental drift and how our Earth will be in the future.

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Title: Formation of a future supercontinent through plate motion-driven flow coupled with mantle downwelling flow
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*1 Amasia: The term Amasia was coined by a geologist, Paul Hoffman to describe a possible future supercontinent that could be formed by the merger of America and Asia.

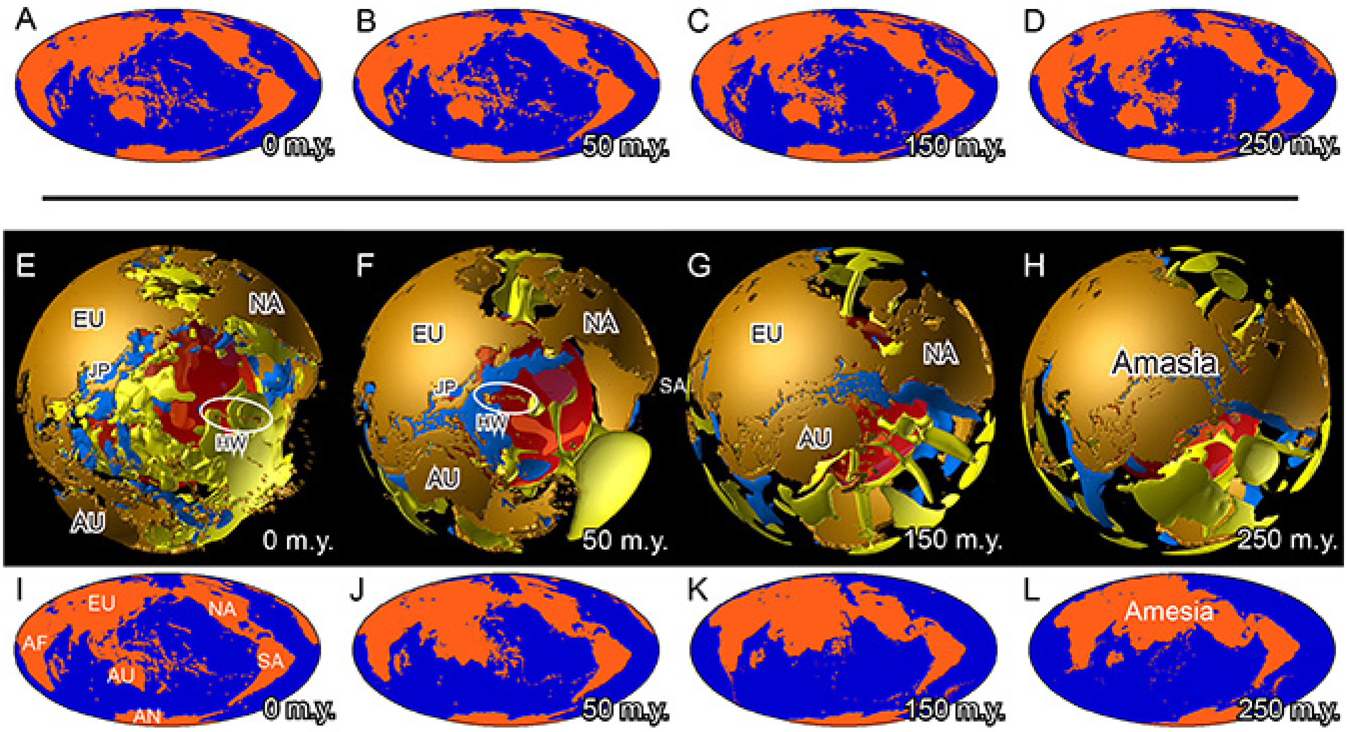

Figure 1. Results of numerical simulations: (A) at present and after (B) 50, (C) 150, and (D) 250 milion years (Myr) from the present. (E-L) Results for Model I showing continental drift and mantle convection (E, I) at present and after (F, J) 50, (G, K) 150, and (H, L) 250 Myr from the present. E-H show three-dimensional views of temperature anomalies and the position of continents at each time stage. Blue and yellow isosurfaces indicate colder and hotter mantles, respectively. Brown regions at the surface indicate the position of the continents. The red spherical surface shows the bottom of the model mantle. Abreviations are AU, Australia; EU, Eurasia; AF, Africa; NA, North America; AN, Antarctica; JP, Japanese Islands; and HW, Hawaian Islands.

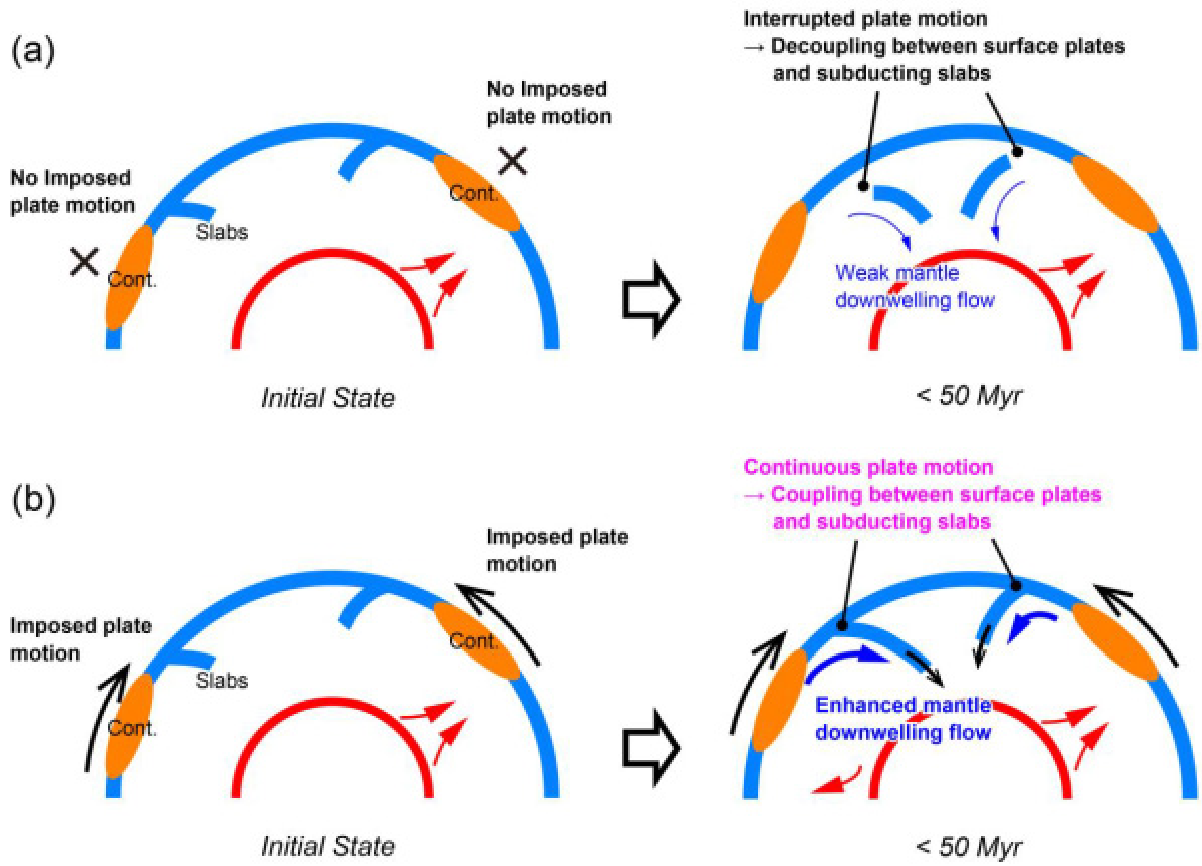

Figure 2. Illustrations showing the effect of imposed plate motions on the subsequent continental drift and mantle flow. In the model without imposed plate motions for the first stage of simulation (a), surface plates do not couple with the subducting slabs and the weak mantle downwelling flow can hardly move the continental plates. On the other hand, in the model with imposed plate motions for the first stage of simulation (b), the surface plates couple with the subducting slabs, which brings about the plate-scale flow and enhances underlying mantle downwelling flow; this is referred to as "plate motion-driving flow."

Continental drift and mantle convection at 250 million years from the present

Brown regions at the surface indicate the position of the continents. Blue and yellow isosurfaces indicate colder and hotter mantles by 200 degrees C than the average of each depth, respectively. The red spherical surface shows the bottom of the mantle (the core-mantle boundary at a depth of 2900km). This video is based on the Model I by Yoshida (2016, Geology).

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