The 396th Geodynamics Seminar

Subduction of continental materials and its effect on the mantle convection

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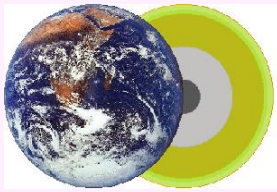

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Abstract

Geological studies have revealed that continental materials subduct from the Earth's surface via the following three mechanisms: tectonic erosion, sediment subduction, and direct subduction of immature oceanic arcs. Here, in order to estimate the supply rate of continental materials to the deep mantle, we have conducted numerical simulations of subduction channels, which is located between slab and mantle wedge, based on the finite difference method and subduction of island arcs based on the finite elements method. The simulations of subduction channels show that a sustainable thickness of the channel in the deep mantle is ~2-3 km and the corresponding flux of continental materials integrated over the length of the current subduction zones is 2.2 km^3/yr. We also found that the water content in the mantle wedge controls the flux of the continental materials especially when temperature of mantle wedge is high. Therefore, the water content of the mantle wedge could be more important in the ancient mantle because of its high temperature. On the other hand, preliminary results of subduction of island arcs show that whether or not the arcs sink to the deep mantle highly depends on the temperature profiles of the subducting slabs.

詳細は当センターホームページ：http://www.ehime-u.ac.jp/~grc/をご覧ください
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