

**【Grant-in-Aid for Scientific Research(S)】**

**Science and Engineering (Mathematical and physical sciences)**



**Title of Project : Growth of the Second Continent and Mantle Dynamics: Insights from a History of Continental Growth and Tectonic Erosion**

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Research Area : Mathematical and physical sciences

Keyword : Earth History, Tectonics, Terrestrial and planetary evolution

**【Purpose and Background of the Research】**

Tectonic erosion could drive a surface to mantle transportation of continental materials (Fig. 1), however any quantitative approach has done about the volume and effect of the subducted materials. We aim to develop a new scenario for the Earth evolution including the recycling effect of the continental materials.

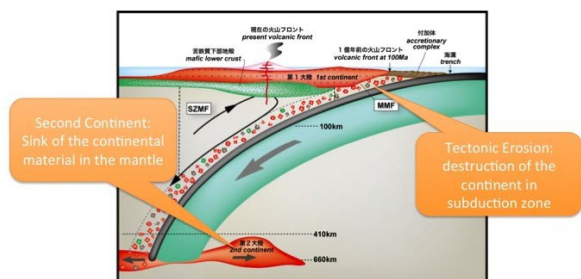


Fig.1 Tectonic erosion and the 2nd continent

**【Research Methods】**

We organize five interdisciplinary groups for the subject. Geology, geochemistry, high-P experiment, seismology, and numerical simulation will be integrated to a new comprehensive model for the Earth evolution.

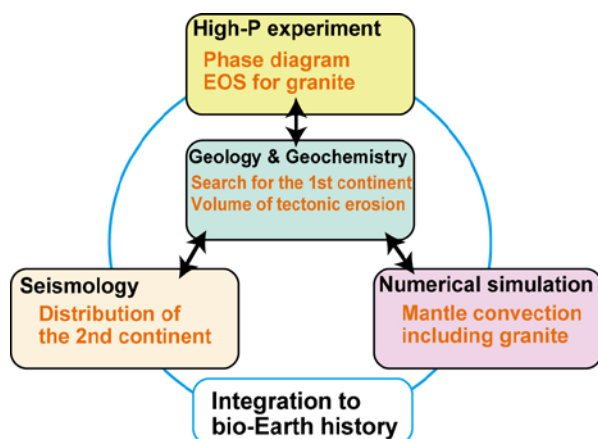


Fig. 2 Organization

**【Expected Research Achievements and Scientific Significance】**

Continental material could be the significant radiogenic heat source in the mantle, however its effect to the mantle dynamics has been underestimated. Our multidisciplinary approach is a unique and never has done. Expected results will renovate a scenario how the Earth has been cooled, consequently it will contribute to understand how the Earth became a habitable planet.

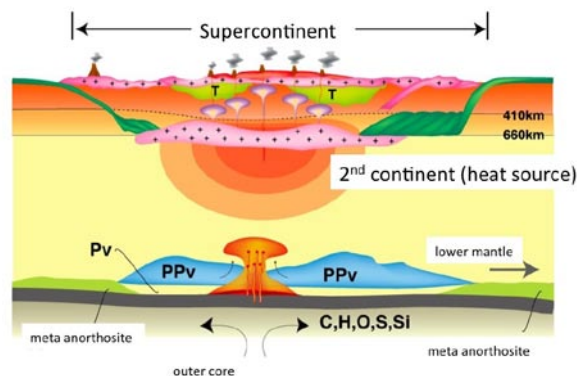


Fig.3 Expected model for the mantle dynamics including recycled continental materials.

**【Publications Relevant to the Project】**

Kawai, K., Tsuchiya, T., Tsuchiya, J., and Maruyama, S. (2009). Lost primordial continents. *Gondwana Res* 16, 581-586.  
Maruyama, S., Omori, S., Senshu, H., Kawai K., and Windley, B.F., (2011) Pacific-type Orogens: New Concepts and Variations in Space and Time from Present to Past, *J. Geography*, 120. 115-223

**【Term of Project】** FY2011-2015

**【Budget Allocation】** 162, 900 Thousand Yen

**【Homepage Address and Other Contact Information】**

<http://www.geo.titech.ac.jp/lab/maruyama/maruyamalab/maruyamalab.html>