Eiichi TAKAZAWA, Ph.D.

Professor

Program: Environmental Science and Technology

Area: Earth Science

Undergraduate: Dept. of Science

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Professional Expertise

He conducts petrological and geochemical studies of orogenic lherzolite massifs and ophiolites to understand (1) magmatic processes at mid-ocean ridge and subcontinental mantle, (2) melt/fluid transport in and interaction with the upper mantle. (3) crustal recycling and its influence on the mantle heterogeneity. He also develops analytical technique using ICP-MS for trace elements including LILE, REE and HFSE.

Research Fields of Interest

Generation and evolution of oceanic lithospheric mantle

- Spatial and temporal evolution of mantle section in the Oman ophiolite
- Spatial variability in mineralogy and composition along ocean spreading ridge
- Partial melting and magma genesis at mid-ocean ridge and juvenile island arc

Orogenic lherzolite massif as lithospheric mantle at continental margin

- Mantle-melt reaction to generate fine-scaled compositional layering
- Banding of fertile lherzolite and refractory harzburigite

Abyssal peridotite as residues of partial melting at mid-ocean ridges

- Mid Atlantic Ridge, 15°20' fracture zone
- Hybridization of melt and mantle peridotite

Petrology of serpentinites in the Joetsu- Ashio belt, Japan

- Serpentinization of forearc peridotite
- Fluid-peridotite interaction

Development of analytical techniques for geochemical data

- Trace element analysis by LA-ICP-MS
- Analysis of REE in sub-ppt level
- Sample preparation methods in clean lab

Mountain and wadis in the mantle section of Oman ophiolite. Flat surfaces formed as river terrace.

Education

1996: Ph.D. in Geochemistry, Dept. of Earth, Atmospheric and Planetary Sciences, Massachusetts Institute of Technology, MA, USA

1989: M.S. in Geology, Graduate School of Science, Hokkaido University, Japan

1986: B.S. in Geology, Dept. of Geology and mineralogy, Hokkaido Univ., Japan

Professional Societies and Activities

1. American Geophysical Union
2. Geochemical Society
3. Geological Society of Japan
4. Geochemical Society of Japan

5. Japan Assoc. of Mineral. Sci.
6. Volcanological Society of Japan
7. Associate Editor of Island Arc

Major Publications

Papers

***Petrology and geochemistry of mantle rocks**

[1] "Compositional variations within the Lower Layered Zone of the Horoman peridotite, Hokkaido, Japan: Constraints on models for melt-solid segregation", *J. Petrol. (Special Lherzolite issue),* pp. 211-227, 1991.

[2] "Geochemical evidence for melt migration and reaction in the upper mantle", *Nature,* vol. 359, pp. 55-58, 1992.

[3] "Magma transport and metasomatism in the mantle: A critical review of current geochemical models—Discussion", *American Mineralogist*, vol. 81, pp. 754-759, 1996.

[4] "Evolution of the Horoman peridotite: Implications from pyroxene compositions", *Chemical Geology*, vol. 134, pp. 3-26, 1996.

[5] "Polybaric petrogenesis of mafic layers in the Horoman Peridotite Complex, Japan", *Journal of Petrology*, vol. 40, pp. 1827-1851, 1999.

[6] "Non-chondritic platimum-group element ratios in abyssal peridotites: petrogenetic signature of melt percolation?", *Earth and Planetary Science Letters*, vol. 172, pp. 65-81, 1999.

[7] "Whole-rock compositional variations in an upper mantle peridotite (Horoman, Hokkaido, Japan): Are they consistent with partial melting hypothesis?", *Geochimica et Cosmochimica Acta*, vol. 64, pp. 695-716, 2000.

[8] "Re-Os isotopes in the Horoman Peridotite: evidence for refertilization?", *Journal of Petrology*, vol. 42, pp. 25-37, 2001.

[9] "Model of layering formation in a mantle peridotite (Horoman, Hokkaido, Japan)", *Earth and Planetary Science Letters*, vol. 185, pp. 299-313, 2001.

[10] "Geochemistry and origin of the basal lherzolites from the northern Oman ophiolite (northern Fizh block)", *Geochem. Geophys. Geosyst*., 4(2), 1021, doi:10.1029/2001GC000232, 2003.

[11] "Compositional continuity and discontinuity in the Horoman peridotite, Japan, and its implication for melt extraction processes in partially molten upper mantle", *J. Petrol.*, 45, 223-234, 2004.

[12] "Hybridization of Dunite and Gabbroic Materials in Hole 1271B from Mid-Atlantic Ridge 15°N: Implications for Melt Flow and Reaction in the Upper Mantle", In Kelemen, P.B., Kikawa, E., and Miller, D.J. (Eds.), Proceedings of Ocean Drilling Program, Science Results, 209, 1–23, doi:10.2973/odp.proc.sr.209.005.2007, 2007.

[13] "Primary melting sequence of a deep (> 250 km) lithospheric mantle as recorded in the geochemistry of kimberlite–carbonatite assemblages, Snap Lake dyke system, Canada", *Chemical Geology*, 255, 3-4, 317-328, 2008.

[14] "A kilometre-scale highly refractory harzburgite zone in the mantle section of the northern Oman Ophiolite (Fizh Block): implications for flux melting of oceanic lithospheric mantle", *Geological Society, London, Speical Publications*, 392, 229–246, 2014

***High pressure experiments**

[15] "Radiation temperatures of soda-lime glass in its shock-compressed liquid state", *Journal of Applied Physics*, vol. 83, pp. 1711-1716, 1998.

[16] "Hugoniot equation of state and high-pressure transformation of jadeite", *Journal of Geophysical Research*, vol. 103, pp. 12261-12268, 1998.

Uppermost part of the Horoman peridotite, Hokkaido, Japan