Newly Discovered mantle province beneath the Southern Ocean

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It is generally accepted that Earth's upper mantle is characterized by Indian- and Pacific-type domains with distinctive isotope characteristics. The boundary between these two mantle regions has been hypothesized to be located at the Australian-Antarctic-Discordance (AAD), where regions west and east of the AAD are Indian- and Pacific-type, respectively. It was further posited that the Pacific mantle is flowing

into the Indian mantle because isotopes show he boundary is moving westward with time. This story has important implications for the global mantle convection. However, our recent recovery of basalts from a 2,000-km sampling gap along the Australian-Antarctic Ridge (AAR), located east of the AAD on the Pacific side, challenges this story: Sr, Nd, Pb, and Hf isotopic compositions of AAR MORB are distinct from those of Pacific and Indian MORB. Rather, the AAR lavas show mixing relationships with Cenozoic volcanoes from the West Antarctic Rift System, the Balleny and Scott Islands, New Zealand, suggesting that mantle beneath this region in a state of dynamic mixing. A deep plume beneath the WARS may sustain the dynamic mixing. The dynamic mixing zone does not extend to adjacent Marie Byrd Land or east Australia because the Cenozoic volcanism in these regions shows slightly different isotopic trends than the AAR. In multi-dimensional isotopic space, however, these bordering regions also share isotopic space with the AAR that is distinct from both the Indian and Pacific mantles. These isotopic evidences suggest the presence of an isotopically distinct mantle province between the Indian and Pacific. The dynamic mixing zone further exhibits a distinct mixing relationship with the Hikurangi seamounts, which were erupted at ~90 Ma. According to tectonic reconstruction models, Hikurangi seamounts are related to super-plume activity that caused Gondwana to break up at ~ 90 Ma, suggesting that the newly discovered mantle province in question may be traced back to the Gondwana break-up. These results indicate that dynamics along the AAD should be reinterpreted in light of interaction with a super-plume.

13:50 - 14:10	**S5 03. Woo Jun Sul** (Chung-Ang Uni., Republic of Korea) *Influence of proximity to Antarctic research stations and anthropogenic activity on abundance of antibiotic resistance genes in soils*
14:10 - 14:40	**S5 04. Bill J. Baker** (Univ. of South Florida, USA) *Chemistry and bioacticity of Antarctic marine organisms*
14:40 - 15:00	**S5 05. Se Jong Han** (KOPRI, Republic of Korea) *Production of biodiesel and bioethanol from the biomass of psychrophilic microalgae chlamydomonas sp. knm0029c*
15:00 - 15:20	**S5 06. Hyuncheol Oh** (Wonkwang Univ., Republic of Korea) *Bioactive secondary metabolites from Antarctic lichens and fungi*
15:20 - 15:50	Coffee Break & Poster Session
Session 6 - Auditorium	**S6. Chronicle of geoscience in Antarctica: From the Era of Peninsula to the Age of Continent**
15:50 - 16:20	**S6 01. John Smellie** (Univ. of Leicester, UK) *Victoria Land volcanism - an overview of recent volcanological and palaeoenvironmental research*
16:20 - 16:40	**S6 02. Gi Bom Kim** (Gyeongsang Nat'l Univ., Republic of Korea) *Bimodal Bubble Generation in Explosive Silicic Volcanism*
16:40 - 17:00	**S6 03. Laura De Santis** (National Institute of Oceanography and Experimental Geophysics, Italy) *The Italian contribution to Seismostratigraphic studies on the Ross Sea*
17:00 - 17:20	**S6 04. Yongcheol Park** (KOPRI, Republic of Korea) *P-wave velocity structure beneath the northern victoria land, antarctica: two separate mantle heat sources*
17:20 - 17:40	**S6 05. Seung-Sep Kim** (Chungnam Nat'l Univ., Republic of Korea) *The kinematic evolution of the Macquarie Plate and its implications for oceanic lithosphere fragmentation*
17:40 - 18:00	**S6 06. Sung-Hyun Park** (KOPRI, Republic of Korea) *Newly Discovered mantle province beneath the Southern Ocean*
18:00 - 19:30	Closing Remarks & Banquet Dinner