

Research Background and Importance

°The Jang Bogo Station has recently opened at Terra Nova Bay of northern Victoria Land. Based on this new infrastructure in the Antarctic continent, researches on the geology of vast rock exposures and the meteorites from the blue ice field are now available. Scientific expeditions have been organized to gather geologic information and space material. The geologic research will focus on understanding the evolution of sedimentary basin, paleoenvironments, and the igneous and metamorphic processes related to assembling and breaking-up of the ancient supercontinent Gondwana. In addition, researches on the Cenozoic volcanoes will shed light on the tectonic setting of the Victoria Land. Researches on meteorites and space material will reveal the formative processes of planets. Accumulation of such research information will provide a basis for the future utilization of the Antarctic continent.

Aim and Contents of research







°Acquiring geological information through survey for rocks and fossils to establish tectonic and crustal evolution models of Victoria Land
 °Securing the space material including meteorites to investigate the early evolution of planets

Road map

Year	2014	2015	2016	2017
Expedition area	Northern Victoria Land	Northern Victoria Land	Northern Victoria Land	Northern Victoria Land
Geological information and tectonic history	Basin evolution and metamorphism with regards to Ross Orogeny	Mesozoic and Cenozoic paleoenvironments and volcanism	Detailed geological map of JangBogo Station and mineral map of Victoria Land	
Meteorite search and planet evolution	Recovery of Antarctic meteorites and cosmic dust	Petrographic and geochemical research on meteorites	Thermal history of meteorites	
Analysis of crustal and space materials	Developing age dating methods using ICP-MS	Noble gas analysis	Developing analytical methods for 1-micron-scale particles	MC-ICP-MS and analysis of extinct nuclides of the meteorites



Crustal evolution of Victoria Land, Antarctica and the formative processes of planets

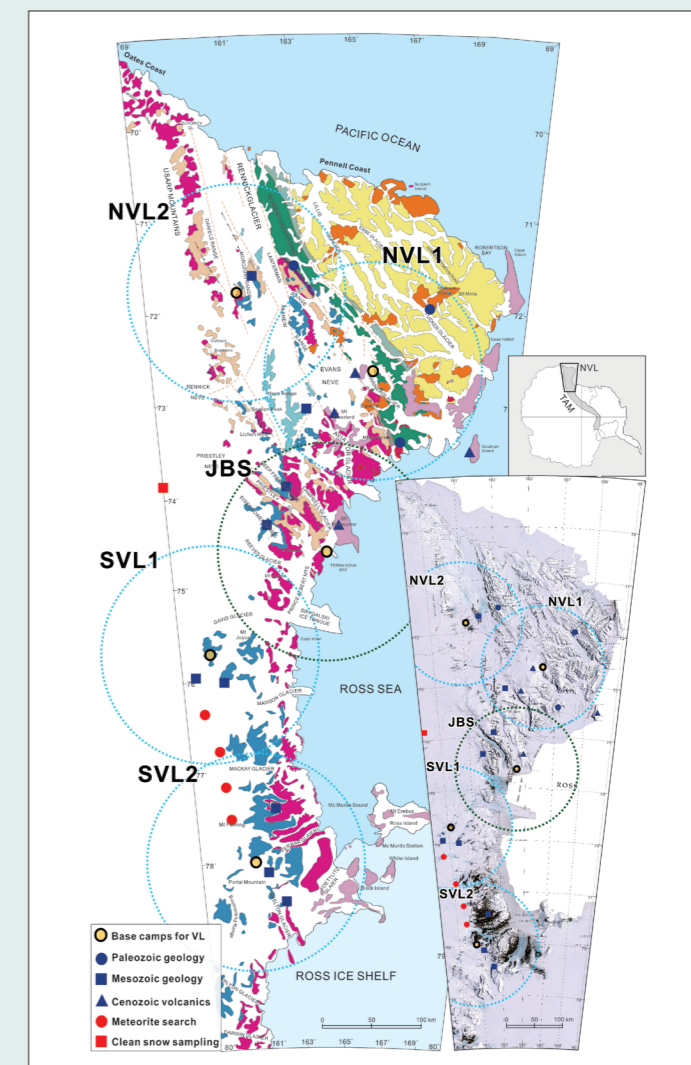
-  Polar Climate Change Research
-  Polar Earth-System Sciences
-  Polar Life Sciences
-  Polar Ocean Environment
-  Arctic Research
-  Promotion Program

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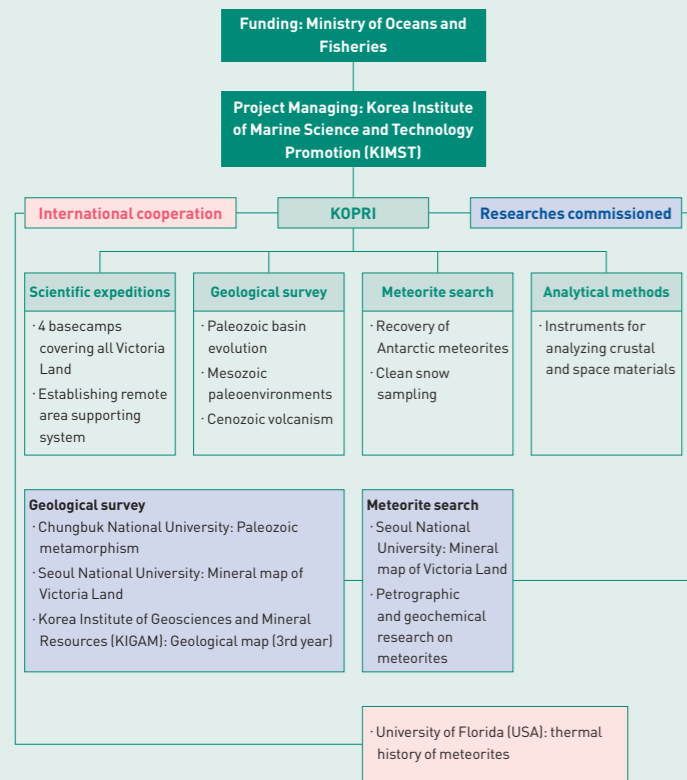
Principle Investigator	Lee, Jong Ik
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Partner Organizations	Chungbuk National University, Seoul National University, BGR (Germany), University of Florida (USA), Tohoku University (Japan), Tokyo University (Japan)
Research Duration	September 2014 ~ August 2018 (4 years)
Research Area	Victoria Land, Antarctica



Aerial extent of the project. Geologic map and satellite image map of the Victoria Land and the major research areas.

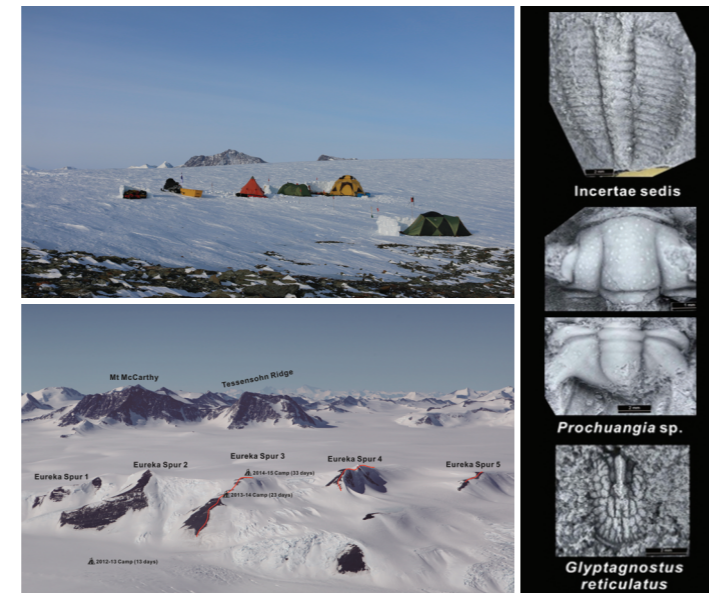
Research method

- **Establishing basis for scientific expeditions**
 - 4 basecamps for supporting scientific activities in the remote areas
- **Geological survey**
 - Basin evolution study using detailed field description of sedimentary strata
 - Paleozoic orogenic processes using metamorphic rocks
 - Mesozoic paleoenvironments by paleontological analyses
 - Cenozoic volcanic processes by analyzing volcanic gases and rocks
 - Detailed geological map around JangBogo Station and the mineral map of Victoria Land
- **Meteorite search**
 - Recovery of Antarctic meteorites and clean snow
- **Developing analytical methods**
 - Age dating methods using LA-ICP-MS*
 - Analysis of extinct nuclides of the meteorites
- **LA-ICP-MS**
 (Laser Ablation Inductively Coupled Plasma Mass Spectrometry)



Overall Outcomes

- **Geological survey on the 500 million-year-old sedimentary basin deposits and fossils was conducted in the Eureka Spurs (ca. 230 km north from Jang Bogo Station)**
 - A detailed columnar description has been made for 1500 m-long strata and new fossil faunas have been discovered



Route of the survey in the Eureka Spurs and 2014-15 summer camp at the top of the Eureka Spur 3

- **Mesozoic tree fossils have been collected to provide information on the environments of northern Victoria Land, 190 million years ago (at Mesa Range area ca. 150-200 km north of the Jang Bogo Station)**



The Mesozoic fossil trees in Mt. Fazio, Mesa Range. Threes were fossilized in the basalts with the trunks standing vertically.

- **An eclogite mineral assemblage which provides evidence for continental collision was discovered in the Lanterman Range area (ca. 350 km north from Jang Bogo Station)**



Geologists approaching the outcrop of eclogite which is an evidence of the continental collision in the early Paleozoic.

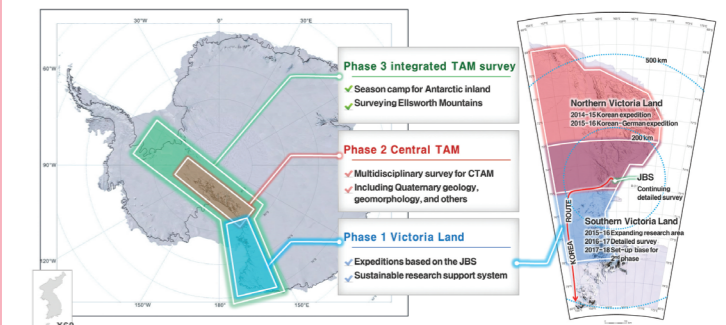
- **81 meteorites and clean snow sample were recovered. The biggest meteorite ever collected by KOREAMET (36.7 kg) was discovered.**



The Biggest meteorite ever collected by KOREAMET.

Future Plans and Application

- Predicting the geological features of the glacier-covered area of Antarctica, and reconstructing the paleogeographic positions of Antarctica and the related supercontinent, through the tectonic evolution models for Victoria Land
- Securing the space material in a cost-effective way through the establishment of a stable meteorites/cosmic dusts recovery system
- Developing a leading technology for the crustal and the space material analyses, with collateral technical improvements of the related fields



- **The emission of volcanic gases near the summit of Mt. Melbourne was newly observed, and the ice around the chimney was sampled (ca. 33 km northeast of the Jang Bogo Station)**



A cloud patch formed by mixing of hot volcanic gases and cold ambient air. The lower photograph shows ice chimneys and the gas emitting through the chimneys.