Under-ice application of Remotely-Operated Vehicle on the Antarctic continental shelf

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What is most characteristic on the Antarctic continental shelf is presence of ice. Antarctic sea ice and land ice play pivotal roles in the global climate system, but the presence of ice itself has been a big obstacle for the conventional research platforms. Recently revealing the Antarctic ice-ocean environment has become a pressing issue, and the developments of appropriate platforms for ice-covered ocean is indispensable. Strategies are highly dependent on the various ice conditions and different seasons. We are developing a Remotely Operated Vehicle (ROV) –NIPROV-2K –capable of 2000m-deep dive at National Institute of Polar Research. In January 2018, Icebreaker *Shirase* launched NIPROV-2K for the first time on the landfast ice region near the coast. It successfully took images near the bottom and proved its capability as a platform for the ice-ocean ecosystem study. We will broaden the operating conditions and areas, and improve the varieties of attached sensors. The most unknowns on the Antarctic oceanic shelf exist in winter. In winter when approach by a ship is usually difficult, mooring is an important option as a platform. We are developing an under-ice tethered profiling platform, which can automatically avoid to collide with sea ice and transmit the acquired data through satellite link when it can successfully surface. This platform should be effective for time-series observations in coastal polynyas. Together with a ship-board platform such as ROV, these development help revealing the mysteries of Antarctic ice-covered ocean environment.

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