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SENSU SuperDARN - progress in Japanese Antarctic Research Project Phase X

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A new phase-X 6-year Japanese Antarctic Research Expedition (JARE) project (2022-2028, JARE64-69) started this spring, including Prioritised Research Projects (PRPs) and long-term monitoring observation. SENSU SuperDARN Syowa radars observation operated by NIPR has become an essential long-term scientific monitoring observational research since this phase X JARE project for long-term stable contribution to broader coverage of magnetospheric, ionospheric and upper atmospheric research and applications, which can also contribute to the PRP particularly on space weather and space climate research - "Aurora Xcosmic" project proposed by Kataoka et al. Their proposal tries to reveal the impact of high energy particles on the Earth's atmosphere with cosmic ray observations and new spectral riometers, etc. and also to understand the geospace environment quantitatively under a lower solar activity where polar cap region observation, such as optical imager network in Antarctica, is essential and important for understanding and predicting geospace under recently started lower solar activity condition after about a half-century long high solar activity period in collaboration with theoretical and simulation studies. In the proposal, SuperDARN is characterised as one of the important tools to provide the global ionospheric condition to contribute to the research. We will discuss mid- to long-range tangible and realistic scientific strategy of SENSU/SuperDARN research including the PRP on space weather/climate and required/desired technical improvement for more stable, near-maintenance-free and more flexible and advanced operation including upgrading antennae and transmitters and imaging capability during JARE phase X period and future, as well as progress so far for coming JARE 64 for 2023 observation.