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A NEW ATTEMPT IN EXPLORING ANTARCTIC SUBGLACIAL SYSTEMS

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The question of stability of the West Antarctic Ice Sheet (WAIS) and the Ross Ice Shelf (RIS) is recognized as being of global importance, and subglacial conditions are thought to play a key role in their dynamics and stability. Basal conditions are governed by several terrestrial and marine processes and are determined by the complex interaction between the ice sheet and ice shelf and their respective underlying geology, hydrology and oceanography. Further, where the ice sheet drains into the ocean, ice-ocean interaction influences both the stability of ice shelves and also the outflow of ice far upstream of its grounding zone. Here we describe a new initiative to investigate this complex interaction and the influence of the subglacial environment (including sub-ice shelf) on the dynamic of West Antarctic ice streams and the stability of the WAIS by direct means. The Ross Embayment Subglacial Traverse (REST) is designed to utilize a new soft coiled-tubing hot-water drilling system to allow rapid access to the subglacial environment while traversing 100s km in a field season. Other specialized instrumentation includes a custom-designed remotely operated sub-sea vehicle (ROV), oceanic observatories including stationary and surveying moorings, a customized sediment corer for recovering over-consolidated and soft sediment, and dedicated customized traverse units (command centres, repair and maintenance units, field laboratory and sample storage units). The multi-year project proposes to drill access holes along a transect from the edge of the RIS to the WAIS interior following the flow of the Kamb Ice Stream. Research will focus on: ice-ocean interaction and dynamics of ice shelves; ice sheet stability and evolution; ice stream mechanisms; subglacial hydrology; subglacial geology and subglacial volcanism; life in extreme environments. The REST will not only conduct research at one of the last frontiers in Polar Sciences, but its interdisciplinary combination of glaciological, oceanographic, geological hydrological and biological investigations, will provide *in situ* data required for a better assessment of the stability of RIS and WAIS, and also the first extensive glimpse into life in these extreme environments.