Subglacial Lakes: Scope for Indian Exploration in Antarctic

Subglacial lake exploration has recently attracted the interest of the scientific community owing to their unique and extreme nature. These are the lakes beneath the ice sheet or glacier with low temperatures, elevated pressures, limited nutrient supply, absence of sunlight and no direct exchange with the atmosphere. Subglacial lakes in Antarctica mainly exist where temperatures at the glacier bed are maintained at the pressure-melting point from a combination of geothermal or frictional heating and the thermal insulation provided by the thick ice cover. These lakes are proving to be attractive models to explore fundamental themes in limnology as well as have direct global implications such as landscape–lake interactions, the viability and adaptation organisms to environmental extremes, and subglacial aquatic environments as a planetary storehouse of ancient microbes and past climate records. Recent studies have shown that these lakes host abundant unique microbial life such as that in Lake Whillans in West Antarctica that house globally relevant pools of carbon and microbes that can mobilize elements from the lithosphere and influence Southern Ocean geochemical and biological systems. Subglacial lake environments could be analogous to extraterrestrial systems such as the icy worlds beneath the Martian ice cap and Jupiter’s moon Europa that could help decipher the existence of life alike. Furthermore, the sediment records from subglacial lakes, owing to their low sedimentation rates, may provide a detailed record of palaeoenvironmental information and may help fill hiatuses in the glacial and palaeoclimatic history of Antarctica and the Earth. In order to further the knowledge of subglacial environments, there is a necessity to address various questions, challenges and technological needs for clean requirements for entry, observatory, deployment, and sample retrieval procedures. Exploration of subglacial environments requires careful and meticulous planning, organization, and international cooperation. along with many man months of repeated visits to the icy continent. This can be achieved by a coordinated program, that is multi- and interdisciplinary in scope as per the scientific goals of SALESGOS. India needs to initiate a multidisciplinary subglacial exploration program in order to assess the scientific potential of these lakes and thus fill in the existing knowledge gaps.