

## The CASCA project and its initial development for clean access to Subglacial Lake Cheongsuk, East Antarctica

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The Korea Polar Research Institute (KOPRI) has conducted extensive ice-penetrating radar (IPR) and seismic surveys across the David Glacier catchment in East Antarctica to identify subglacial lakes that are both scientifically promising and logistically accessible. These efforts led to the detailed characterization of Subglacial Lake Cheongsuk—an active lake approximately 50–80 m deep and 19 km<sup>2</sup> in area, lying beneath ~2,300 m of glacial ice. In 2020, KOPRI initiated the Clean Access to Subglacial lake Cheongsuk in Antarctica (CASCA) project, with the goal of accessing this pristine environment using clean hot water drill (CHWD) technology. The full-scale drilling operation is currently scheduled for the 2028/29 Antarctic field season and is being developed in collaboration with the British Antarctic Survey (BAS). The CASCA system is based on the CHWD platform originally designed by BAS for the Subglacial Lake CECs (SLC) project. To meet the rigorous standards required for clean access, KOPRI is advancing several contaminant-minimization technologies. These include a mobile clean laboratory for real-time drilling monitoring, a wellhead UV collar for sterilizing drill hoses and equipment surfaces, and a drill water sterilization unit. We here introduce the current development of these clean-access components, describes their design and function, and shares preliminary test results. These integrated systems are critical to ensuring successful and contaminant-free sampling during the first clean access to Subglacial Lake Cheongsuk.

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