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ABSTRACT

In response to the 'oldest ice' challenge initiated by the International Partnerships in Ice Core Sciences (IPICS), new rapid-access drilling technologies through glacier ice need to be developed. These will provide the information needed to qualify potential sites on the Antarctic ice sheet where the deepest section could include ice that is >1Ma old and still in good stratigraphic order. Identifying a suitable site will be a prerequisite for deploying a multi-year deep ice-core drilling operation to elucidate the cause and mechanisms of the mid-Pleistocene transition from 40 ka glacial–interglacial cycles to 100 ka cycles.

As part of the ICE&LASERS/SUBGLACIOR projects, we have designed an innovative probe, SUBGLACIOR, with the aim of perforating the ice sheet down to the bedrock in a single season and continuously measuring in situ the isotopic composition of the melted water and the methane concentration in trapped gases. We present the general concept of the probe, as well as the various technological solutions that we have favored so far to reach this goal, and lastly the current status of the probe construction and tests.