



## **Sub-glacial penetration from an ice driller's and a biologist's perspective**

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Since the discovery of sub-glacial lakes there is an ongoing discussion how to penetrate into the sub-glacial environment in a contamination free way. The ice drilling community is frequently encouraged to address the sampling of sub-glacial lakes. The approaches I have heard so far address sterile sampling techniques. As biologists intend to study DNA fragments also, the sampling method has not only to guarantee sterility but also absolute cleanliness. There are suggestions to penetrate into Lake Vostok out of the under-pressured deep ice coring hole. Our experience at the EPICA (European Project for Ice Coring in Antarctica) Dronning Maud Land (EDML) deep drilling project has not yet proven the applicability of the approach to penetrate from an under-pressured hole. At EDML we drilled into the bottom of the East Antarctic ice sheet out of an under-pressured hole. We kept under-pressure to be safe under any circumstances, even though the pre-site survey suggested a frozen sub-glacial bed. At the bottom of the hole, sub-glacial water entered the drill-hole at a flow rate of more than one litre per minute. The samples we took from the top of the column at the water-drill-liquid-interface are contaminated by the drill liquid. We have not re-drilled the refrozen column yet, but plan to study the applicability of the method, as suggested for Lake Vostok, this way. In my opinion it will be extremely difficult to get uncontaminated samples out of any deep ice coring hole that is stabilized by aliphatic drill liquids. In my opinion the preferred method is hot water drilling. I will discuss the application of hot water drilling to proceed towards the sub-glacial bed and present a possibility to purify the hot water to acceptable standards for biological applications. As several deep ice-coring projects are finished right now and the investigation of the sub-glacial environment is an emerging field with unsolved sampling problems, this contribution intends to foster discussion amongst biologists and the deep ice coring

community by suggesting a new way of sampling. The exploration of the sub-glacial environment is one of the major challenges to the glaciological and cryo-biological community for the next decades. Nothing could suit the aims of the IPY better, than the engagement into such an emerging inter-disciplinary field.