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An enhanced percussion hammer mechanism for a subglacial sediment corer

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Subglacial sediments are of great interest to the science community. They can contain physical, chemical and biological information that can reveal changes in ice sheet history and identify and characterise life in those environments. However, retrieving sediment cores from up to 1000's of metres beneath the ice surface, through hot water drilled access holes, at remote field locations, presents numerous challenges. Motivated by the need to minimise weight and corer diameter, simplify assembly and operation, and maximise sediment recovery, British Antarctic Survey designed a percussion corer that was built by UWITEC. Here we outline the percussion corer design for use through subglacial access holes and then detail the new auto release mechanism that provides clearer feedback of its operation to the surface and improves the efficiency of the percussion hammer. Where englacial sediments are present in the access hole wall, measures to mitigate against material jamming the hammer mechanism are presented. Using a winched single rope for both the corer and hammer mechanism, this system has successfully operated at depths of up to 2150 m.

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