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Preliminary analyses on quartz-rich sand from near the base of the Berkner Island Ice Core, Antarctica

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Burial ages from a quartz-rich (>95 %) ice-soaked sand deposit extracted from near bedrock at 948 m in the recently drilled Berkner Island Ice Core (BIIC), Antarctica, will provide key information on subglacial processes operating at the base of the ice sheet and, potentially, a means to cross-check the BIIC age-depth model. New granulometric, morphological, geochemical and coarse-grained (90-150 μm), purified quartz fraction optically stimulated luminescence (OSL) data presented here are the first step in applying a combined OSL/cosmogenic isotope ice-burial age dating method. Results thus far indicate: (i) grain size, sorting and bulk geochemical characteristics of the ice core sand are similar to quartz-rich sand deposits from offshore shallow marine cores extracted from the Berkner Bank; (ii) the sand in the ice and marine cores has experienced at least two distinct modes of deposition; (iii) the sensitivity of the quartz is sufficient for OSL dating analysis; (iv) multiple grain OSL dating test runs, using purified quartz from Berkner Bank marine core sand that has not been exposed to light, suggest the natural OSL signal was not fully reset during the final deposition event. This means single grain OSL dating analysis might be needed to isolate accurate age specific information for the ice core sand. Current work during the 2005/6 Antarctic field season includes retrieval of further ice-soaked sand samples that have not been exposed to light and laboratory experiments recreating likely environmental OSL dose rates within the ice-soaked sand deposit.