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70 m double hole drillings for paleoceanographic research with the sea floor drill rig MeBo

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A major progress in paleoceanographic research is expected from the ability to get longer sediment cores in the deep sea than typically recovered by gravity or piston coring. During the research cruise $SO_2$11 on the research vessel SONNE in November 2010 the sea floor drill rig MeBo was used to recover up to 70 m long sediment cores at the continental slope off Chile at water depths between 550 and 960 m. The MeBo is a remotely controlled drill rig that is deployed on the sea bed. Up to 30 wire line core barrels with a stroke length of 2.35 m and a core drilling diameter of 55-63 mm (HQ barrel size) can be stored together with the same number of drill rods on two magazines on the rig.

A total of 270 m were drilled in hemipelagic sediments during expedition $SO_2$11 in 5 deployments at 3 sites with the longest drilling reaching 71,45 m below sea floor. Average core recovery rate was close to 90 %. Double hole drillings were conducted at two sites. Color and XRF scanning data show a good match between the cores recovered from the two MeBo deployments at each side. These data are used for splicing both records in order to get a continuous composite record closing the gaps between the single core barrels of each deployment and show the capability of the sea floor drilling MeBo for recovering continuous long sediment sequences.

More than 70 m long continuous sediment records can be drilled with the sea floor drill rig MeBo. This technology developed at the Marum Center for Marine Environmental Sciences will be suitable even for drilling longer cores up to 200 m. In order to approach this drilling depth the magazines and drill tower of a second generation MeBo have to be sized up for doubling the stroke length of the core barrels. Additionally, the number of core barrels that can be stored in the magazines has to be increased slightly.