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Ice-sheet variations as depicted in seismic records of the Amundsen Sea Embayment, West Antarctica

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The dynamics of ice-sheets in response to climate changes have increasingly become a focus of research. In this regard the glacial history of the Amundsen Sea sector of the West Antarctic Ice-Sheet (WAIS) is of particular interest. A potential deglaciation and collapse of the Thwaites and Pine Island glacier drainage basins alone would result in a global sea level rise of approximately 1.5 m.

New multichannel seismic reflection data of high-resolution offer a record of the glacial development and processes in this area. We present a first interpretation of five seismic profiles collected in the western Amundsen Sea Embayment as part of the RV Polarstern cruise ANT-XXIII/4 (2006). The sea-floor morphology of the observed area is highly variable. Close to the present coast, a rough topography includes several troughs with a depth of almost 2000 m which were probably formed by palaeo-icestreams cut through the shelf. Here, the seismic lines reveal hardly any internal sequences. Only a thin sedimentary cover or some sediment pockets ($<$ 80 ms TWT $\sim$ 60 m) on and in between these steep and rugged structures can be identified.

On the northern shelf and outside the troughs, the topography is generally smooth and shows only small surface undulations. For this region we suggest a much quieter depositional realm, which was not much affected by melt water streams. Only the uppermost sedimentary cover layer, which runs parallel to the seafloor, is interrupted by small scale roughness features of a few metres height. At some locations, shallow and about 10 km wide channel-like structures cut through this upper seismic unit. They may be an indication for the activity of recent melt-water streams.

Below the sedimentary cover northwest-dipping reflectors are striking features in the seismic sections and indicate other well pronounced sedimentary units of more than 1 s TWT thickness ($>$ 800 m). These older and dipping layers form an unconformity with the young sedimentary cover. Inbetween these dipping layers units with transparent reflection pattern alternate with sequences of parallel, closely spaced internal reflections. This alternation probably represents changes in depositional conditions as due to sea level variations or periods of ice-sheet extension.