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Massive submarine debris flows on the eastern Wilkes Land continental margin (East Antarctica)

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Massive slumps and debris-flow deposits are found in the inferred Oligocene to Late Miocene glaciomarine sequences beneath the continental slope and upper continental rise of the eastern Wilkes Land margin (East Antarctica). Off George V Land these debris-flow deposits accumulate in front of erosional shelf troughs carved by ice streams during times of glacial maxima. High- and low-resolution multichannel seismic data allow us to recognize two main separate massive sediment failure events. The older (?Eocene-Oligocene) failed sediments lie on top of a regional unconformity (WL-U3) that on the continental shelf is interpreted to separate mostly aggradational pre-glacial sequences below from gently progradational glacial sequences above. The younger (?Oligocene-Middle Miocene) failed sediments lie within sedimentary sequences (i.e., WL-S4 and WL-S5) interpreted to form under a temperate glacial regime. These two massive debris-flows events are buried by younger sequences (i.e., WL-S6 to WL-S9, ?Late Miocene-Recent). The WL-S6 to WL-S9 sequences have been deposited under subpolar to polar glacial regimes and consist of less disturbed sedimentation mainly dominated by turbidite deposition with debris-flows deposits focused within the channel-levee axes. The massive failures observed in the early glacial sequences of the eastern Wilkes Land margin resemble those described in the Norwegian margin. As suggested for these

Norwegian deposits, which occurred under a more temperate glacial regime with rapid sediment input from ice-streams, we postulate that in the eastern Wilkes Land margin, the massive early glacial debris-flows record the first emplacement phases of a highly dynamic, temperate to polythermal ice sheet that delivering high sediment inputs to the deeper portion of the continental margin.