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Morphodynamics and slope stability at Mergui Ridge, off western Thailand

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2D seismic data from the top and the western slope of the Mergui Ridge (200 km off the Thai west coast) have been acquired during MASS cruise III in January 2011 in water depths between 300 and 2200 m. The Mergui Ridge is a part of the outer shelf slope off the Thai-Malay Peninsula and forms the eastern boundary of the East Andaman Basin. Structural features in the working area include faulted older slope sediments at the transition from Mergui Ridge to East Andaman Basin that are onlapping on the (acoustic) basement of Mergui Ridge. At their top these sediments are bordered by a pronounced erosive unconformity. Younger sedimentary units on top include three E-W elongated carbonate platforms. Moreover, drift sediments are deposited on top of the ridge, comprising features such as large scale sediment waves and moats around the platforms indicating transport and reworking of the sediments. These sediments are thinning towards the edge of the ridge where a zone of non-sedimentation prevails. In the East Andaman Basin younger sediments comprise disturbed and partially faulted units that are overlain by plastered drifts with increasing thickness towards south, where pronounced sediment waves within the drifts may indicate slope normal sediment transport by bottom currents. At the basin ridge transition, within the drift sediments on top of Mergui Ridge, and at the edge of the ridge several smaller scale mass transport deposits were identified. These MTDs indicate a general instability of the slope.
Instability and general morphology of the slope may result from long-term tectonic processes such as extension due to backarc basin formation in the Andaman Sea basin. Moreover, phases of uplift, erosion and subsidence may have contributed to faulting and deformation of older units in our working area. Ongoing tectonics might still cause deformation and instability. In addition, bottom currents may presently play an important role concerning morphodynamic development by transporting and reworking drift sediment units and thereby shaping their morphology by along slope transport on top of the Mergui Ridge and slope normal transport in the East Andaman Basin.