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Complex submarine landsliding processes caused by subduction of large seamounts along the Middle America Trench

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Subduction of kms-tall and tens-of-km wide seamounts cause important landsliding events at subduction zones around the word. Along the Middle America Trench, previous work based on regional swath bathymetry maps (with 100 m grids) and multichannel seismic images have shown that seamount subduction produces large-scale slumping and sliding. Some of the mass wasting event may have been catastrophic and numerical modeling has indicated that they may have produced important local tsunamis. We have re-evaluated the structure of several active submarine landlide complexes caused by large seamount subduction using side scan sonar data. The comparison of the side scan sonar data to local high-resolution bathymetry grids indicates that the backscatter data has a resolution that is somewhat similar to that produced by a 10 m bathymetry grid. Although this is an arbitrary comparison, the side scan sonar data provides comparatively much higher resolution information than the previously used regional multibeam bathymetry. We have mapped the geometry and relief of the head and side walls of the complexes, the distribution of scars and the different sediment deposits to produce a new interpretation of the modes of landsliding during subduction of large seamounts. The new higher resolution information shows that landsliding processes are considerably more complex than formerly assumed. Landslides are of notably smaller dimensions that the lower resolution data had previously appear to indicate. However, significantly large events may have occur far more often than earlier interpretations had inferred representing a more common threat that previously assumed.