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Chronology and sedimentary characteristics of rock avalanches from Meseta Belgrano to Lago Pueyrredón Valley, Patagonia

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On the northern slopes of Meseta Belgrano (MB), eastern foothills of Patagonian Andes in Argentina, complex of multiple overlapping rock avalanches and landslides can be found. Interpretation of remote-sensing data, field mapping, together with OSL dating of lacustrine sediments revealed that slope collapses evolved during last oscillations of the Patagonian Ice Sheet and after its retreat. The longest rock avalanche with ~11 km runout originated most likely before the last glacial advance following the LGM because it involves moraine deposits in part of the scarp area. We suppose, that the distal part of the rock avalanche body was subaqueous due to presence of a proglacial lake in Lago Pueyrredón Valley after LGM. The hummocky character of the distal body and its lithological composition coming from MB bedrock was preserved, but the deposit is discontinuous with straight east-west glacial lineations on the surface. We think this is result of erosion by the ice sheet approaching from East during post-LGM glacial fluctuations. Next pronounced landslide activity took place after ~17 ka BP, when at least three rock avalanches overlaid lacustrine sediments in a dropping proglacial lake. One of them, superimposing the above described older rock avalanche, evolved from the collapsed moraine deposit and created ~5 km long lobe with subaqueous radial distal part. In the proximal parts of the rock avalanches east from this form, bellow the slopes of MB, distinct large ridge-like forms are visible in topography. They are similar to moraine ridges preserved on the MB slopes in higher altitudes. They can be interpreted as lower-lying moraines, but this requires another pronounced ice-sheet oscillation after its final retreat, which was not documented in Patagonian Ice Sheet chronostratigraphy. Thus, we interpret them as Toreva blocks. Documentation and granulometric analysis of natural outcrops in rock avalanche bodies show that typical features, i.e. blocky, jigsaw and fragmented facies are present throughout the depth along whole travel distances of rock avalanches. Fragmented facies with jigsaw-fractured blocks and preserved original lithology sequence are most frequent. Sedimentary facies are very similar in all of the studied rock avalanches, which collapsed from bedrock MB slopes, regardless of their age or size.