

Pale Siliceous Layers in Colluvium of Tasmania's Tyenna Valley: E Horizons or Aeolian?

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The hill slopes in Southern Tasmania's upper Styx and Tyenna valleys are mantled with colluvial layers and white siliceous layers resembling E horizons. I investigated whether these white layers were pedological E horizons or aeolian deposits derived from quartzose sands that occur up-wind in the local area.

The area is dominated by Permian sedimentary rocks containing quartz dropstones which physically weather to fine gravel sized scree and chemically weather to olive yellow coloured clays. Permian derived materials, scree and colluvial clays, are dominant in the landscape however distinct pale layers are also present. Permian rocks do not weather to the quartz rich fine sands observed within the pale layers, and their almost complete lack of Permian-derived lithic fragments implies an alternative provenance.

Particle size analysis of the pale layers shows they have a high proportion of very fine sand (125 to 20 μm), implying that sorting of the particles by transport has occurred. The quartz sand particles within the pale layers are sub-angular to angular, so an alluvial origin is unlikely. The pale layers have previously been dated to the Late Pleistocene between 53 ka and 25 ka by McIntosh et al. (2012; sites 39, 40 and 50), a period in which conditions in southern Tasmania were cold and very windy. The pale layers are not associated with underlying clayey B horizons so are unlikely to be part of relict (buried) texture-contrast soils. This combined evidence suggests that aeolian deposition from a nearby source of siliceous material is the most likely mechanism producing the pale layers.

The interlayering of pale materials, scree and more clayey colluvium with paleosols provide valuable climatic indicators, particularly for determining when conditions alternated between cold-dry-windy and warmer-moister conditions in southern Tasmania.