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RELICT ICE IN THE DRY VALLEYS, ANTARCTICA

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The 8 Ma relict ice in Beacon Valley, Antarctica has been the topic of much debate since Sugden and others reported it in 1995. However, the occurrence of relict ground ice, is not unique to Beacon Valley, and it is found in a variety of forms within one metre of the surface in many parts of the Dry Valleys. This ice is important because it not only drives the development of Dry Valley landscapes but also contains a paleoenvironmental record. Furthermore, it is our best analogue for understanding the presence of ice on Mars. In this paper we compare the properties and occurrences of ground ice from the Beacon, Pearse, Victoria, and Wright Valleys and Table Mtn. We also show several methods of core sampling frozen sediments and ice.

The origins of relict ground ice are complex and may overlap. Ablation models suggest this ice should be younger than 10,000 years, yet it persists under very old surfaces. In appearance, it ranges from clear massive ice, to debris-rich ice, to pore-filling ice in sediments and soils. Our studies suggest that the ice can result from *in situ* processes or from stranded remnants of past glaciers and lakes. Highly deformed debris-rich ice may result from accumulated strain of multiple advances and retreats of cold-based glaciers or from rock glaciers and gelifluction processes. Although we cannot provide absolute dates for the ice, their relative ages also give insight to their origins.

To improve our understanding of the Antarctic climate system, it is crucial to understand climatic signatures that may be present in these features. Although these features probably may not yield high resolution climate data, their data provide an terrestrial history that will complement marine and ice core data.