

**COLD-BASED GLACIER HYDROLOGY, WRIGHT LOWER GLACIER, MCMURDO DRY VALLEYS**

S.A. MacDonell, S.J. Fitzsimons

*University of Otago, Dunedin, Otago, New Zealand*

Glacier hydrology has been studied in the McMurdo Dry Valleys since the 1950s, with most work focusing on lake and stream dynamics, with little consideration of the water source, the glaciers. The aim of this project is to observe the seasonal development of the Wright Lower Glacier's drainage system. This paper will focus on the onset of melt at this glacier, with a view to describe the conditions necessary for melt to occur. The early melt season was observed in the 2005/06 field season, using meteorological data, ice temperature profiles and field observations. Weather data was collected on the glacier surface, and included incoming and outgoing solar radiation, net radiation, air temperature and relative humidity. Ice temperatures were recorded at four sites on the glacier surface, installed across a supraglacial channel cross-section. These thermistor leads were 80 cm long, and recorded temperatures at 10 cm intervals. They were placed in the north-facing cliff, the channel floor, the south-facing slope and in a cryoconite hole. Melt initiation at the Wright Lower Glacier is largely influenced by sediment accumulation and aspect. Melt initially occurs on sediment covered regions, as the lowered albedo allows more energy to be absorbed, which enhances melting. Aspect is also important in determining melt location, as there is a strong diurnal trend in solar radiation receipt. Melt is first seen on north-facing cliffs, weeks before melt is observed on other parts of the glacier. As the solar zenith angle decreases, and more radiation is received in other parts of the channel, allowing melt to start on the channel floor, and lastly on the south-facing slopes.