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Evaluating the feedback to Land Surface Temperature resulting from changing snow cover

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A decline in terrestrial snow cover in the high latitude regions will likely lead to a large change in albedo, with implications for terrestrial ecosystems and regional climate. We compared maximum, minimum and average Land Surface Temperatures (LST) derived from MODIS Terra and Aqua to MODIS fractional snow cover for altitudinal tundra in the southwest Yukon, Canada, between 2002 and 2010. We calculated daily minimum and maximum LST using the two hour window before dawn and the two hour window centred on solar noon, respectively. Due to the convergence of satellite overpass time and time of dawn, only April through August of each year was available for analysis. These values were composited into monthly averages of minimum, maximum and average LST. Due to perennial cloud cover monthly averages were required to mitigate cloud cover effects. A trend analysis of MODIS cloud cover was conducted to assess the applicability of the LST trend analysis to climate change and whether an increase in cloud cover implies the potential for negative feedback to climate. MODIS fractional snow cover was compared to the aggregated LST to determine how a reduced snow cover effects surface warming.