

Analyzing RADARSAT-1 Imagery to Determine Variability and Trends in Ice Cover on Shallow Lakes near Churchill, Manitoba

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ABSTRACT:

Climate variability and change, especially in arctic regions, have been of increasing concern over the past several years. Previous studies have shown that lake ice freeze-up (FU) and break-up (BU) dates are useful indicators of local climatic conditions since these dates are heavily influenced by atmospheric forcing. Lake ice thickness has also been shown to be sensitive to climatic influences such as temperature and precipitation. Using a ten year historical archive of RADARSAT-1 (C-HH) ScanSAR Wide imagery (1966 to 2006) along with Canadian Lake Ice Model (CLIMo) data, patterns in climate were assessed. Low temporal resolutions of the RADARSAT archive made it difficult to tell exact FU and BU dates. CLIMo is a one-dimensional thermodynamic model capable of simulating ice phenology. In addition the analysis of a series of RADARSAT-1 images is an indirect method of observing FU and BU dates without actually being present. Therefore, this archive was still useful in validating CLIMo's ice phenology dates. It was found that there was no specific pattern in climate that would suggest either warming or cooling. However, ranges for FU and BU dates over the 10 year period were 25 to 42 days respectively. With the recent introduction of RADARSAT-2, increasing satellite coverage and more accurate observational capability are now available to monitor these fluctuations.

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