PROGRESS REPORT on 2011 FIELD ACTIVITIES
Glacier Mass Balance Studies in the Canadian High Arctic
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INTRODUCTION

Collectively, glaciers and ice caps from the Canadian Arctic represent the largest mass of ice outside of the Greenland and Antarctic Ice Sheets Recently, these features have been reported to be one of the largest contributors to global sea level rise (Gardner et al, 2011), which will have additional impacts on marine ecosystems and ocean circulation patterns. Measurements of glacier mass balance to date reveal accelerated rates of ice loss in response to recent climate warming, particularly since the mid 1980's. The objectives of this study are to continue these long term measurements of glacier mass balance and pollution from 4 sites across the Canadian high Arctic in order to monitor the rapid environmental changes that are occurring across this region.

RESULTS FROM SPRING 2011

Glacier Mass Balance Measurements

All mass balance measurements on Melville, Meighen, Agassiz, and Devon ice caps, and the Grise Fiord glacier (Figure 1) were successfully acquired. Data collected in 2011 give mass balance results up to September 2010. Results of the glacier mass balance surveys indicate that the Meighen, Agassiz, and Devon ice caps experienced mass losses slightly greater than the long term rates. Melville however experienced the second greatest loss (first being 2007) of almost 5 times greater than the long term average.

Satellite Validation over the Devon Ice Cap

Ground surveys involving Kinematic GPS, Ground Penetrating Radar, Shallow Ice Core, and Snow pits were conducted along several transects across the Devon ice cap. Coincident airborne overflights were performed by the Danish Technical University and NASA carrying a variety of laser and radar altimeter instruments. Results from this work contribute to the practical usage of satellites to help monitor changes to the ice caps and glaciers in the Canadian Arctic

WORK PROPOSED FOR 2012

Scientific Measurements

We propose to continue the glacier mass balance measurements over the Devon, Agassiz, Meighen, and Melville ice caps, and the Grise Fiord Glacier. Additional work on the Devon ice cap will involve airborne overflights across the ice cap and associated measurements on the ground. There are no significant changes to the work planned for 2012 relative to the activities performed in 2011.

Logistics

Transportation to field sites will be provided by the Polar Continental Shelf Program. All work on site will be performed out of permanent huts that exist on the Meighen and Melville ice caps, tents on the Agassiz and Devon ice caps, and the Co-op Hotel while in Grise Fiord. Transportation at each site will be by snowmobile.

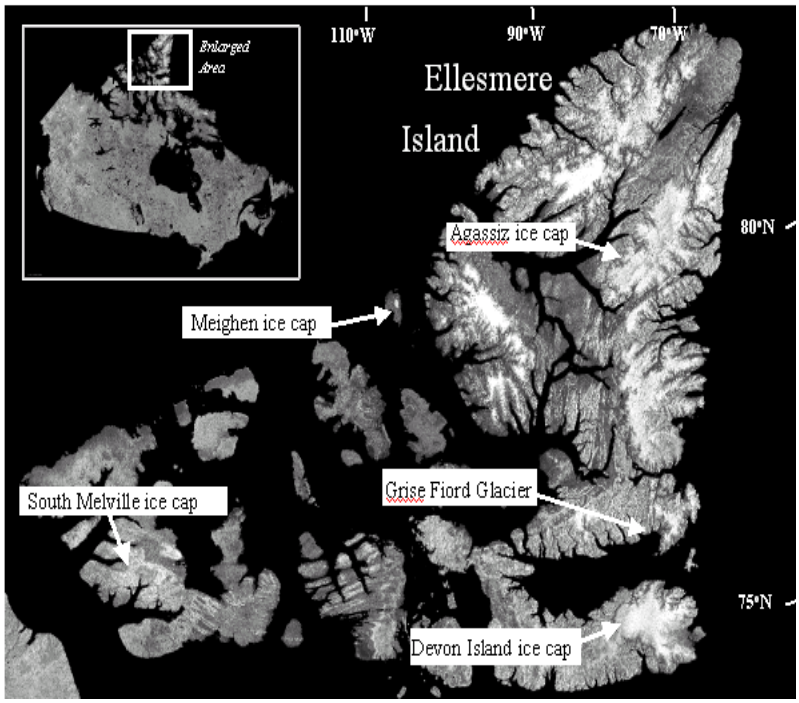

Figure 1. Location of the glacier mass balance sites across the Queen Elizabeth Islands.