Understanding the role of anthropogenic and climate forcing that influence the environment Hamilton Inlet, Labrador

Nonna Belalov
Department of Physics and Physical Oceanography
Memorial University

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ABSTRACT: Recently, there has been growing interest in the climate variability in Newfoundland and Labrador and its impact on the environment. The warming temperature trend in the past two decades has driven changes in the ice thickness and characteristics of surface inland and coastal ocean waters. In the Hamilton Inlet, these changes are superimposed on the impact of hydroelectric development in Churchill River. Studies of the characteristics of regional climate change and anthropogenic factors are essential for understanding the environmental response. The main objectives of this study is to assess the characteristics of climate variability and anthropogenic impact of recent hydroelectric development in Labrador.

The method of the study is based on statistical analysis of observations of atmospheric and river flow characteristics. The non-parametric Mann-Kendall (MK) trend test and Sen's methods were applied to determine the presence of a positive/negative trend in atmospheric data. Abrupt changes and periodic fluctuations in climate indices were found using cumulative sum of differences (CSD) curves, while shifts in decadal temperature were determined using the Kernel Density (KD) estimator. Furthermore, the Welch's power spectral density (PSD) is estimated, in order to identify the dominant periods (or frequencies) of the atmospheric time series.

The first part of the study is focused on characteristics of seasonal, internannual and decadal variability of atmospheric temperature, precipitations and wind and their spatial variations. We found in particular, that the multidecadal trend of atmospheric temperature was negative between 1970 and 1993 and changed to positive in the following period. The magnitude of this trend and its spatial variation across the province is assessed.

The second part of the study presents results from an analysis of extremes of regional climate characteristics. Climate extremes are identified by calculating the 90th/10th percentiles of minimum and maximum daily temperature, which correspond to extreme
warm/cold events; the 90th percentile was also calculated for total precipitation, snow and rain, to study extreme precipitation events.

This is a MSc final presentation and graduate students from our department are especially encouraged to attend.

ALL ARE WELCOME!