Statistical Modeling of Meteorological Variables at Seasonal Timescales

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Overview

This project aimed at developing a statistical model of seasonal to multi-seasonal anticipated temperature and precipitation for the Great Lakes basin. This projection will be empirically based on analysis of previously observed ocean temperature patterns, worldwide 700 mb geopotential heights, precipitation and air temperature over North America, and Great Lakes temperatures.

2002 Plans

Apply for funding again. Various funding sources are being considered. Assess feasibility and value. CCA hindcasts of historical data will be produced and validated. Assessments will be made as to whether there is significant value added to the long-term outlooks for the Great Lakes Basin by adding Canadian temperatures and precipitation and Great Lakes surface temperatures as predictors.

2001 Accomplishments

Dr. Robert Rohli, supported by a grant from the Board of Regents of the State of Louisiana, visited GLERL for the week of August 6-10, 2001. Together with Dr. Lofgren, he developed an updated proposal of work, which will be submitted to the National Science Foundation for funding, and for which other potential funding agencies are being sought. The novel approach which is proposed in this is that empirical prediction will be carried out in two basic steps. First, the current situation with regard to global teleconnection indices will be placed into one of several bins prepared using the classification and regression tree (CART) method of Rodionov and Assel. This step accounts for non-linear or “jump” relationships between these bins. Following that, canonical correlation analysis (CCA) will be used to create linear regression relationship, which should be more valid when based only on an individual bin within the CART analysis, rather than basing a regression on all available data.

1999 Accomplishments

Gathered data and made plans for a project to develop an empirical/statistical model to produce monthly probabilistic outlooks of precipitation and temperature over the Great Lakes Basin, with lead times of up to 6 months. This effort included organizing a day-long workshop at GLERL on 23 June 1999 with 7 attendees.