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Development of a reliable wind database for eastern Canada.

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Any inferences resulting from the analysis of meteorological records lean on the robustness of the observational data. Uncertainties in the data can be roughly classified into two groups: uncertainties due to random and systematic errors. Random errors are unavoidable and inherent to the very nature of the measurements as instrumental responses to various physical phenomena. Systematic errors, are produced by scale shifts of the instruments or by some more or less persistent factor that is not accounted for. Therefore, it is essential to develop procedures that allow to identify and correct the observations for these errors thereby improving the quality of the data sets.

This work involves the compilation, quality control and first analysis of a data set of wind variables from a wide area over eastern Canada, including the provinces of Quebec, Prince Edward Island, New Brunswick, Nova Scotia and Newfoundland in addition to the adjacent ocean areas. The data set spans the period 1940-2009 and has been compiled from two different sources: a set of 422 land sites obtained from Environment Canada (1940-2009) as well as subset of 23 buoys distributed over the East Coast and the Canadian Great Lakes (1988-2008) provided by the Department of Fisheries and Oceans. Spanding the data set beyond the USA borders in order to provide a more uniform distribution over the area will also be considered in the future using other sources (NCAR, NDBC, IGRA, etc.).

After the compilation of the initial data set, quality control techniques are applied involving the detection and correction of random measurement errors, outliers as well as systematic changes (inhomogeneities) in sampling procedures. The impact of these corrections in the dataset will be evaluated. This is the first step of a regional study that will be mainly focused in the area of Nova Scotia. The variability of the wind field will be analyzed in relation to the specific features of the local topography and to changes in the large scale circulation. Subsequent studies will address the high spatial resolution simulation of the wind field using a regional climate model (WRF) and its validation with the presently developed dataset.