



Predictability and forecast skill on decadal timescales

G. J. Boer, V.V. Kharin, and Wm. Merryfield

Canadian Centre for Climate Modelling and Analysis, Environment Canada, Victoria, B.C., Canada (george.boer@ec.gc.ca)

Decadal predictions of annual mean temperature, produced with the Canadian Centre for Climate Modelling and Analysis (CCCma) coupled climate model following the augmented protocol of the fifth Coupled Model Intercomparison Project (CMIP5), are analyzed for information on both climate predictability and forecast skill. External forcings associated with greenhouse gases and aerosols and with volcanoes and solar variations are incorporated. Initialized forecast results are compared with the results of uninitialized climate simulations. Model-based values of "potential predictability" q and "potential correlation skill" ρ are obtained and ρ is compared with the "actual correlation skill" r for the external forced and internally generated components of annual mean temperature. As expected, $\rho > r$ and both decline with forecast range τ , at least for the first five years. This decline is associated with a loss of skill for the internally generated component while the correlation skill of the forced component increases slightly then remains relatively constant with τ .

The potential skill of the forced component is largest at tropical latitudes while that of the internally generated component is largest over the Northern Atlantic, North Pacific and Southern Oceans. Potential skill is weaker over land than over oceans. The distribution of actual skill r is broadly similar to that of ρ for the externally forced component but less so for the internally generated component. Differences in potential and actual skill are suggestive as to where improvements in the forecast system might be sought.