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## Downscaling of Climate Model Output for Alaska and Northern Canada

2010

Abstract: Statistical downscaling provides a means to bridge the gap between the coarse resolution output of climate models and site-specific climate information for which there is a particular need in the Arctic. The observational databases, model output and statistical methodologies are now available for a downscaling project targeted at Alaska and northern Canada, in collaboration with other regional Arctic downscaling projects coordinated by the Arctic Monitoring and Assessment Program. We propose a three-tiered approach to an implementation of downscaled climate projections for the North American Arctic through 2100. First, 21st-century changes projected by the IPCC Fourth Assessment models that perform best for the Arctic will be fused with a high-resolution (2 km) climatology of Alaskan temperature and precipitation. Second, the output from the models will be adjusted by using the biases in the models' means and variances to optimize the output from the models' projections. This approach will be applied to daily as well as monthly output, allowing for the analysis of changes in extreme events. Third, existing software packages for statistical downscaling (e.g., Clim.pact, SDSM) will be implemented for Alaska and northern Canada. The Arctic's intensive observatories at Barrow, Alert and Eureka will be focal points in the algorithm development and validation. The products will be consolidated and archived with Arctic downscaling output from other Arctic countries for use in future climate impact assessments.