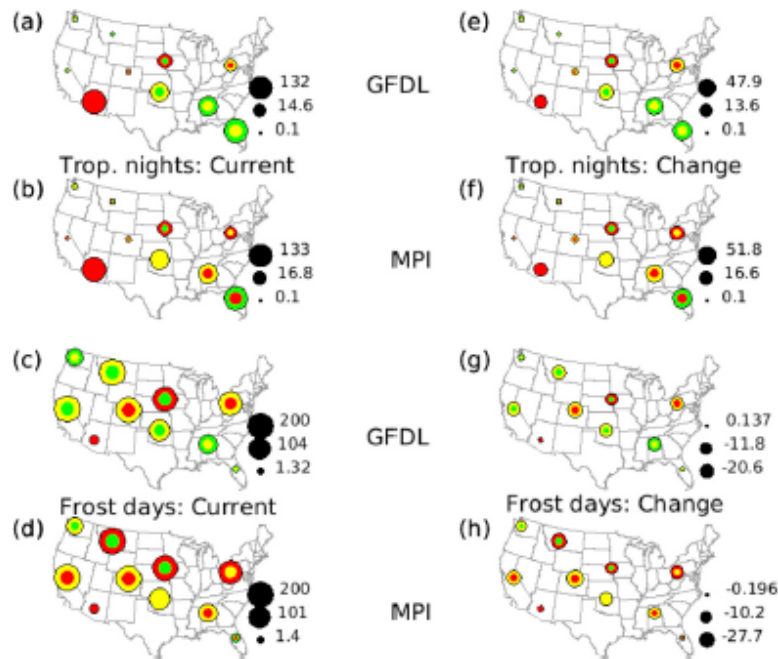


Differential Credibility Assessment (DCA) for Statistical Downscaling



Results of daily minimum temperature (T_{min}) downscaling as manifest in the frequency of (a),(b) tropical nights and (c),(d) frost days for the contemporary climate from GFDL or MPI. (e)–(h) Difference in frequency per year in the future (2075–99) minus the current (1979–2005) of these CLIMDEX indices.

Symbol size scales linearly with frequency of occurrence [in (a)–(d)] or the difference [future minus current; in (e)–(h)].

Maximum, median, and minimum values across the 10 locations are shown in the legends. Colors denote two aspects of the DCA (outer and inner circles) —red = low, yellow = moderate, green = high.

Pryor S.C. and Schoof J.T. (2020): Differential credibility assessment for statistical downscaling. *Journal of Applied Meteorology and Climatology* **59** 1333-1349

Scientific Achievement

We present a robust systematic approach to quantifying and depicting the fidelity of statistical downscaling. This is an essential step forward to objectively assigning confidence to climate projections. A further methodological advance is presented that ensures the statistical downscaling models more accurately represent variability in the predictand (response variable).

Significance and Impact

The DCA approach employs transfer functions in the form of robust and resilient generalized linear models with variance enhancement that also captures temporal autocorrelation and thus renders it possible to more accurately compute impact-relevant output such as the CLIMDEX metrics.

Research Details

Methodology is illustrated by downscaling daily minimum and maximum temperature at 10 locations using predictors from ERA-Interim and 2 GCM; GFDL-ESM2M & MPI-ESM-LR.

