The variability of weather and the predictability of climate

Daily temperature across one year: one day is hard to predict ten days ahead.

Ten-day average for same year

Ten-day averages for multiple years

Climate State #1 for those years: predictable

Climate State #2 for a series of years, earlier or later: predictable and different

People sometimes ask “If we can't predict the weather ten days from now, how can we predict climate a hundred years from now?” The answer lies in the fact that weather is by definition random, but climate is more constant and thus more predictable. A meteorologist can't tell you the high temperature in Chicago ten days from now with much precision or confidence, but a climatologist can tell you the average high for a month six months from now with greater precision and much more confidence.