

“Is Climate Really Predictable on 10-50 year time-scales?”

William R. Cotton
Dept of Atmospheric Science
Colorado State University

An overview of major climate forcing mechanisms is presented. For each of the mechanisms, sources of major uncertainties and whether or not the forcing mechanisms are predictable is discussed. In addition, I review estimates of the natural variability of climate over the last 1000 years. It is concluded that the natural variability of climate is larger than suggested by several investigators as indicated by the Medieval Warm Period and the Little Ice Age. The implication to long term climate prediction is that there are components to the climate system that are stochastic and unpredictable (like volcanoes), that there are forcing factors that still are not explained physically, or quantified well in existing models (like solar/cosmic ray forcing), and that CO₂ greenhouse warming is only important to climate forcing everything else being the same. It is therefore concluded, that climate on time scales of 10-50 years is inherently an unpredictable system.