



Imprints of climate forcings in local and global temperature series

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Temporal evolution of variables within the climate system is governed by various effects, associated with both external influences and internal climate dynamics. While many of the climate-forming factors have global reach, the nature and magnitude of their individual contributions often differ from region to region. In this presentation, we use statistical analysis to investigate the geographical distributions of local contributions from various external and internal forcings, detected in gridded monthly temperatures in the 1901-2010 period. Furthermore, we study how these local influences combine in the temperature signals on continental and global scale. Results for several datasets of gridded monthly temperature are studied and compared, including NASA-GISS (GISTEMP), Berkeley Earth and 20th Century Reanalysis. Multiple linear regression is applied as the primary tool for separating the contributions from individual factors; the explanatory variables employed represent anthropogenic (greenhouse gasses concentration) and natural (solar and volcanic activity) forcings, as well as large-scale internal climate oscillations (Southern Oscillation, North Atlantic Oscillation, Atlantic Multidecadal Oscillation, Pacific Decadal Oscillation). Attention is also paid to the possibility of time-delayed responses to the forcings.