

Recent Climate Change over the Tibetan Plateau

Anmin Duan, Guoxiong Wu

State Key Laboratory of Numerical Modelling for Atmospheric Sciences and Geophysical Fluid Dynamics (LASG), Institute of Atmospheric Physics (IAP), Chinese Academy of Sciences (CAS), Beijing, China

Chung-Hsiung Sui

Institute of Hydrological Sciences, National Central University, Chung-Li, Taiwan, ROC

Abstract

Recent climate warming over the Tibetan Plateau is accompanied by a distinct decreasing trend of the diurnal range of surface air temperature, a significant increasing trend of low-level cloud amount during the nighttime, and a decreasing trend of total cloud amount during nighttime. Meanwhile, the change in the upper atmosphere is featured by a warming trend in the mid- and lower-troposphere but a cooling trend in the upper troposphere and lower stratosphere. All these features can be reproduced in two coupled climate models forced by observed CO₂ concentration of the 20th century but can not be reproduced by the fixed external conditions before the industrial revolution. These suggest that the recent climate warming over the Tibetan Plateau primarily results from the increasing anthropogenic greenhouse gases emissions, and impacts of the increased greenhouse gases emissions upon the climate change in the plateau are probably more serious than the rest of the world.