



Formation Mechanism of an Extreme Hot Weather in North China on 12-13 July 2015

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A strong hot weather was happened in North China on 12-13 July 2015. The mean daily maximum temperature was about 36 °C and many stations in this region had an maximum air temperature over 40 °C. In this study, the observational data, reanalysis data and Forecasting data produced by the operational forecast system in Beijing, China are used. The forecast system predicted the temperatures well. Therefore, we use the forecasting results to investigate the formation mechanism of this extreme hot weather. The results indicate that the anticyclone, sensible heat flux, horizontal heat flux and adiabatic heat contribute to the hot weather. Sensible heat flux is the greatest contributor for the warming in the entire region of North China, but horizontal heat flux exhibits a strong spatial and temporal distribution and even contributes more than sensible heat flux at the extremely high temperature regions. Besides these factors, at the lee sides of adjacent Mountains in North China, the backward trajectory analysis shows that adiabatic heat of descending air flow is another important reason of the hot weather. For instance, the air parcel descents about 2.5km from 11 BJT to 16 BJT on 13 July over a site at the southern part of North China. This adiabatic process induces the rise of the air parcel temperature for 25.5 °C.