

Analysis of blocking characteristics and associated climate anomalies based on observational data and model simulation for the 20th and 21st centuries

Abstract

Climate change has been a topic of intense interest to the global community. It is of great interest to individual societies to anticipate not only how climate can change locally, but how the variability of regional climate may change. The study of blocking events provides a unique opportunity to carry out this work. We will use model results in an increased carbon dioxide environment to study how the climatic and dynamic character of blocking events may change in a warmer world. This research group will identify blocking events and examine their character using methods that we have developed jointly in the past and published in the literature. These methodologies are based on the zonal index. We will also use dynamics that are well-established to examine their behavior. We will examine these events using potential vorticity diagnostics as well as examining the stability of the flow using fundamental mathematics. It is anticipated that in a warmer world, blocking events will be more numerous, weaker, and longer-lived. This would be consistent with an environment in which there is more storminess. We also anticipate that the interannual variability will change appreciably over some parts of the world (North America, Europe, and Asia), but not in others.