Impacts of Warm Season Blocking Events across Western North America and the Western Canadian Arctic

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While many studies on the impacts of persistent blocking events have focused on the cold season, the events of recent summers are a powerful reminder that the consequences of blocking are felt in the warm season as well. From the 2004 blocking episode that resulted in 40,000 deaths and a forty percent reduction in agricultural output over Western Europe to the 2010 episode that directly contributed to the deadly Russian wildfires and Pakistani floods, recent events demonstrate that the impacts of blocking in the warm season are often quite severe. In this study, we develop a climatology of warm season blocking events in the Pacific to investigate the impacts on the sensible weather and climate of western North America and the western Canadian Arctic. We also present a detailed case study of the August 2010 blocking event over the north Pacific. During this event, pronounced ridging over the north Pacific and western Arctic led to enhanced transport of warm, moist air over western Canadian Arctic where observed temperatures during the month of August were persistently as much as ten degrees warmer than climatology. Over western North America, the persistent blocking led to abnormally dry conditions that contributed to a record wildfire season in western Canada, where, according to Environment Canada, the number of burned acres in British Columbia exceeded the long-term average by upwards of 300 percent by mid-August. The blocking episode appears to have also contributed to record-breaking floods in Iowa. Other events are also discussed to demonstrate the variety of warm season blocking impacts.