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The influence of physics parameterizations on precipitation extremes in the Newcastle east coast low of 2007

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East coast low (ECL) events are one of the major sources of extreme precipitation on the eastern Australian seaboard. In fact, it is not uncommon for a location to receive a significant portion of its average yearly rainfall in one to two days from an ECL event. Because of this, developing ways to accurately simulate ECL events and compare modeled extreme precipitation to observations is an important and challenging goal. We investigate how the Weather Research and Forecasting (WRF) model simulates extreme precipitation for ECL events with an emphasis on understanding the connection to model physics. We focus on the Newcastle ECL of 2007, which was one of the most powerful ECLs in recent memory, with high precipitation and strong winds in the Newcastle area. We examine the sensitivity of precipitation extremes to microphysical schemes, radiation schemes, boundary and surface layer physics, and cumulus parametrizations. Using the Bureau of Meteorology rain gauge network, we compare the observed hourly accumulations to the model precipitation fields using an ensemble based approach. This comparison shows that WRF, when appropriately configured, does simulate the extreme precipitation well, although there are important differences between the physics parametrizations. Also, we show how the cumulus parametrization, and to a lesser extent the boundary layer, can have a significant impact on the most extreme hourly accumulations. Extreme accumulations on daily and longer time scales are less sensitive to the choice of physical parametrization.