# High-resolution ensemble prediction of the East Coast Low of April 2015

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During autumn and winter months, the eastern coast of Australia is periodically affected by rapidly developing and intense extratropical low-pressure systems, commonly known as East Coast Lows (ECLs). ECLs bring damaging winds, heavy rainfall with flooding that can last for several days and coastal erosion. Due to their rapid development, many forecasting issues arise, such as predicting which part of the coast will be impacted, and the intensity and location of maximum winds and rainfall. The use of ensembles can help in overcoming these challenges, improve forecasts and better depict forecast uncertainty, and also give a better understanding of how these systems form.

The event studied here occurred during 20-23 April 2015, with the most severe impact on 21 April. It was the worst ECL event in nearly a decade and a devastating event for the Dungog and Maitland area (about 200 km north of Sydney), with at least four deaths reported and widespread damage. This event was simulated using a 24-member ensemble of the Australian Community Climate and Earth-System Simulator (ACCESS) nested models (global, 4.0 km and 1.3 km). The smallest grid spacing (1.3 km) sufficed to capture the dynamics of the event. The simulated ensemble-mean forecast rainfall is in good agreement with observed rainfall and the ensemble identifies Dungog as the area at significant risk of extreme rainfall.

Here, ensemble sensitivity is investigated, to understand how different dynamic features of the flow are related to the predictability of the event. A subset of ensemble members shows very little rain around the Dungog area; in these ensemble members the heaviest rain was moved further south or east, indicating that a large part of the coast was at risk of significant rain.