Attribution of extreme rainfall events in the South of France using EURO-CORDEX simulations

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This study investigates how climate change affects the heavy precipitation events that occur in the Fall autumn in the South of France. We used an ensemble of 10 EURO-CORDEX model simulations with two horizontal resolutions (0.11 and 0.44 degree) for the attribution of extreme rainfall in the autumn in Cévennes mountain range (South of France). The attribution of extreme daily rainfall amounts is therefore made for the first time using high-resolution climate models from 3 datasets including EUR-44, EUR-11 and BC-EUR-11 (i.e. CDFt bias-corrected EUR-11). These datasets, after pooling all of models together, are fitted by stationary Generalized Extreme Value (GEV) distribution for several periods to estimate a climate change signal in the tail of distribution of extreme rainfall in the interest region. The results show that higher-resolution simulations with bias adjustment provide a robust and confident increase of intensity and likelihood of occurrence of autumn extreme rainfall in the area in the current climate in comparison with the historical climate. Concretely, the probability (exceedance probability) of 1-in-1000-year event in historical climate may increase by a factor of 3.1 under current climate with a confidence interval of 1.7 to 7.4 following the BC-EUR-11. Simulated changes are in agreement with observed ones as obtained in a previous study.