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Synoptic and small-scale sources of uncertainty in forecasting moist convection

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The location and timing of moist convection is strongly influenced by the large scale atmospheric conditions, but also by local perturbations such as heat and moisture anomalies induced by surface variability. In presence of strong orography, one expects the large-scale conditions to play a dominant role since ascent driven by flow over orography can dominate other small-scale perturbations. We attempt to test and quantify this expectation by examining mesoscale ensemble forecasts produced using the COSMO-LEPS regional ensemble forecasting system. Forecast quality is assessed using a novel objective measure based on pyramidal image matching between IR satellite observations and synthetic images produced from model output. This measure quantifies displacement errors between observed and simulated cloud features, and is thus particularly suited to localised cloud and precipitation features. Results will be presented from four case studies, ranging from Alpine conditions to the very modest orography of south England. A stochastic convective parameterisation to model small-scale uncertainty is currently being implemented and preliminary results will be presented if available. The methodology developed here will be applied in a longer-term trial, using the operational COSMO-LEPS forecasts during spring and summer of 2007.