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The impact of SST anomalies on the aggregation of convective clouds

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We investigate the role of a localized and positive SST anomaly on the aggregation of deep convective activity in cloud-resolving simulations in radiative-convective equilibrium over a region with periodic boundaries. We consider SST anomalies of various sizes and amplitude, keeping the domain average SST constant. Earlier studies with homogeneous SST find that radiative feedbacks are necessary for both the onset and maintenance of self-aggregation. In this configuration, we find that an SST anomaly can change the range of large-scale SST for which aggregation occurs and can significantly changes the aggregation speed. With a localized SST anomaly sufficiently large and/or strong, we find that aggregation can occur, even if we remove the radiative feedbacks by horizontally homogenizing radiation profiles. The positive SST anomaly triggers the onset of convective aggregation by decreasing the local static stability and by initiating a large-scale circulation with convection over the anomaly and compensating subsidence over surrounding region