How do ocean temperature anomalies favor or disfavor the aggregation of deep convective clouds?

1. Questions addressed
   - How an idealized warm circular SST anomaly, referred to as “hot spot”, helps organize convection?
   - How self-aggregation radiative feedbacks modulate this organization?
   - How large-scale circulation generated by SST gradients?
   - Migration towards warm SST? [e.g., Tompkins 2001; Kuang 2012; Coppin Bony 2017]

2. Cloud-resolving simulations with hot spot
   - Near-surface air temperature (colors) and clouds (gray surfaces)
   - Hot spot, small domain
     - Small hot spot & domain
     - Some organization but no aggregation
   - Hot spot, large domain
     - Large hot spot & domain
     - Aggregation even without radiative feedbacks

3. Aggregation due to large-scale circulation induced by the hot spot
   - Radiative feedback
   - No radiative feedback
   - Forced by H.S. instability
   - Pushed
   - Pulled

4. Conclusions
   - When SST anomalies are present, circulation induced by the hot spot can accelerate aggregation
   - Even without radiative feedbacks, hot spots can lead to aggregation
   - Interactive SST delays circulation, thus aggregation [Shamekh et al 2020 JAMES]