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Convective-scale updrafts and downdrafts: a parameterization perspective on cloud resolving simulations of tropical oceanic convection.

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Main processes driving the life cycle of oceanic tropical convection are known for a while, highlighted in the seventies during field campaigns such as GATE. However, nowadays, most of those processes are still mis-represented in parameterizations of deep convection for climate models. This is particularly true for precipitating downdrafts and associated cold pools but also for mesoscale updrafts. One reason for this is that observations can not provide all information that would be needed to understand the key mechanisms involved in the initiation and development of such structures. Here, cloud resolving simulations of tropical convective systems observed off the coast of Australia during the monsoon season in 2006 (TWP-ICE campaign) are analyzed in order to characterize downdrafts responsible for most of the transport of mass, heat and moisture or those leading to the formation of cold pools. In particular, this allows to extract variables corresponding to internal variables of parameterizations of deep convection such as downdraft mass-flux, vertical velocity, fractional area and buoyancy. Those results are then used to evaluate the parameterization of downdrafts in GISS modelE and LMDZ GCMs and propose further development.