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## A new conceptual picture of the transition layer

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The transition layer in the trades has long been observed and simulated, but its origins remain little investigated. It is often associated with an about 150 m deep layer at the top of the subcloud layer that acts as a barrier to overlying convection. Using extensive observations from the EUREC4A field campaign, we propose a reconceptualization of the transition layer. Strong jumps at the mixed layer top, as expected from the theory of cloud-free convective boundary layers, are only found rarely and when they occur, they tend to occur in large cloud-free areas. We show that small clouds with their bases around 600 m maintain the transition layer, in analogy with the maintenance of the trade-wind inversion by deeper clouds. From this analysis also emerges the potential for an alternate view of entrainment mixing, which is based on the ability to detrain condensate into the transition layer and induce gentle sinking motion through negative buoyancy. Mixed layer theory and Paluch mixing diagrams are also used to gain inferences into entrainment mixing.