The marine atmospheric boundary layer over the eastern Pacific and its simulation in climate models

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**Introduction**

Previous studies have shown traversed the southeastern Pacific stratus/cumulus region. CF and cloud base, LWPs, and cloud top, and the cloud liquid water path (LWP) (Zhou et al. 2006) have been shown to be an important prediction of the treatment of stratus/cumulus clouds in numerical weather prediction and climate models.

**References**


**Data**

The data used here was mostly from the second half of the EPIC cruise in which the ship traversed the southeastern Pacific stratus/cumulus region. CF and cloud base, LWPs, and cloud top were derived from measurements made by a ceilometer, a microwave radiometer, and the cloud, respectively. To avoid the possible influence of continental contamination, we only used data from a five-day period (10-15 October 2005), in which there were complex measurements of CF, LWPs, and cloud base and top heights.

**Are cloud properties normally distributed?**

*The data in Fig. 5 shows that LWP is proportional to CF* by Eq. (5).

\[
\text{LWP} = \frac{1}{4} \text{CF}^2
\]

Where A is the adiabatic change of LWP with height. A is a constant describing the deviation from adiabatic LWC. Thus, LWC is completely adiabatic, A would be 1.

**Can we parameterize CF using LWP?**

Such probability distributions can be used to determine a statistical model to calculate CF (e.g., Conditou et al. 1997). In this type of model, CF is defined as the integral of the probability distribution of LWPs, \(p(LWP)\), starting from a threshold of LWP in which is set to be 0.79 using the median value of 0.68 and 0.84. This implies that the increase in LWP with height is about 21% less than the adiabatic value.

**Stochastic characteristics of stratus and cumulus over the Eastern Pacific**

The results suggest that, while it is tempting to use simple LWP to find CF in numerical models, it is more appropriate to use different CF vs. LWP relations for various regions as a function of CF and relative humidity. A similar analysis of different relative humidity intervals should be undertaken to determine its relationship to CF.