

## ***Interactive comment on “On the relationship between low cloud variability and lower tropospheric stability in the Southeast Pacific” by F. Sun et al.***

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Received and published: 3 March 2011

The work “On the relationship between low cloud variability and lower tropospheric stability in the SE Pacific” by Sun et al. is a welcome addition to our general understanding of the ocean-atmosphere coupled system in this region. The scientific merit of this work and specific criticism will be provided by the reviewers, but I offer a few additional comments that could be useful to the authors.

Figure 3 shows the 1-Point correlation map between the area-average cloud anomalies (SE Pacific box) and cloud anomalies elsewhere at interannual timescales. Figure 5 is its analog at daily time scales. In both cases, the relative high correlations are

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interpreted as spatially coherent cloud variability. Part of the high-correlation values, however, result from the way the calculation is done.

A more stringent test to spatial coherence will be an EOF analysis of the cloud anomalies over the SEP (at both timescales). Such analysis can be easily implemented and the leading mode (if significant) will be very informative on the cloud variability coherence. From my own synoptic experience, I found that day-to-day variability is less geographically coherent than implied in Fig. 5. There are many coastally trapped perturbations along the north-central Chilean coast that often propagate into open ocean affecting the SE Pacific cloud deck several days later (Garreaud et al. 2003; Rahn and Garreaud 2010).

One may also wonder whether or not the LTS field is spatially coherent. This point is relevant for interpreting Figs. 4 and 8.

Finally, I'd like to point to the works by Painemal et al. (2010) addressing the high frequency variability of Stratocumulus at San Felix Island (27°S, 80°W) and Garreaud et al. 2008 focusing in the year-to-year variability of fog and low cloud off the Chilean coast at 30°S. In both cases, the correlation between cloud anomaly and local LTS is similar to the values reported in Sun et al. work.

### References

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Interactive comment on *Atmos. Chem. Phys. Discuss.*, 11, 3777, 2011.