

Interactive comment on “Synoptically-induced variability in the microphysical properties of the South East Pacific stratocumulus deck” by D. Painemal and P. Zuidema

Anonymous Referee #1

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General comments

This article is very interesting, trying to examine stratocumulus cloud properties of the coast of Chile in connection with synoptic forcings and the aerosol. The subject is complex because of plenty of processes that can potentially affect cloud properties and that are all tightly coupled. The paper is difficult to read, because of that complexity but I hardly see a way to improve the presentation. The paper is indeed well written and well structured.

I have just one small criticism, namely that the classification proposed here is taken as granted and not discussed anymore. Composite studies rely on a priori, arbitrarily

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defined, classification. Here, the terciles of the droplet number concentration in the Arica Bight. I am not saying that this choice is not appropriate. The paper demonstrates the contrary, with interesting differences between MAX and MIN Nd. However, the reader would like to know what the authors think of their choice, if they have tested other classifications, if they think a different one would bring more insights, and which one? I am not suggesting a long section, but just a short paragraph in the last Section, for the authors to share their experience at the end of this study.

Detail comments.

Fig. 1a: Use different symbols because it is difficult to discriminate black and grey dots.

Fig 1-b: even the line represents a mathematical best fit, I don't like it because it illustrates a non-physical relationship between aerosol concentration and MODIS derived droplet concentration: droplet concentration greater than aerosol concentration at low values. Considering the dispersion of the data points, the best fit anyway has no value. If a line is to be plotted, I would rather start at the coordinates [30;10] and finish at [1000;1000]. The best would be the plot functions currently used to parameterize that relationship, starting at about 30 for aerosol concentration and then saturating at 200 or 300 for the droplet concentration (see the parameterizations of Ghan or Pinty).

Fig. 4. Difficult to discriminate the symbols. Please use the same as in Fig. 5 with open circles and black triangles

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