

## ***Interactive comment on “Influence of convection and aerosol pollution on ice cloud particle effective radius” by J. H. Jiang et al.***

**Anonymous Referee #2**

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This paper presents a simple parameterization of ice cloud effective radius ( $R_e$ ) observed from MODIS in relative to convective strength (CONV) derived from MLS ice water content (IWC) at 215 hPa and aerosol optical thickness (AOT) from MODIS. The parameterization in this study is quite straightforward. Although  $R_e$  is not only function of CONV and AOT and this paper do not consider any other meteorological parameters except two, it can be the first step to understand the role of aerosol on ice cloud in upper troposphere.

General comments

1. The simple comparison between AOT and ice cloud radius can be controversial because AOT represents mostly surface aerosol but ice cloud radius can be influenced by aerosol in upper troposphere. It is not guaranteed that the upper tropospheric aerosol

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can be the same as total atmospheric AOT as described by author's previous work (Jiang et al. 2009), and can be influenced by both AOT and convective activity including rainfall.

2. Author assumes that the detection of IWC at 215 hPa infers deep convection. However, cirrus clouds above deep convective clouds can be observed frequently (e.g., McFarquhar et al. 2000). Therefore, it is confused whether MODIS  $R_e$  can represent top of deep convective clouds.

3. This paper does not consider cloud top height except for  $\text{CONV} > 1$ . Does author think that cloud top height has minor effect on ice cloud effective radius?

Specific comments

1. You need to add lots of missing references used in this paper to the list. —e.g. Platnick et al, 2003; Remer et al., 2005; Wu et al., 2009; Rienecher et al., 2008; Su et al., 2006; Jiang et al., 2007

2. (page 23093, line 8) Macfarqure -> McFarquhar

3. (page 23095, line 3) Does 'the mean of all the 215 hPa IWC sample' include clear sky or not?

4. Fig 2. Can you show the error or standard deviation?

5. (page 23098, line 21) Can you show more labels such as 2.0 in Fig 2c and 3?

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