

## ***Interactive comment on “Longwave indirect effect of mineral dusts on ice clouds” by Q. Min and R. Li***

### **Anonymous Referee #1**

Received and published: 12 April 2010

The paper presents satellite retrieval data from clouds over the Atlantic Ocean with the aim of investigating the effects of dust aerosol on the radiative properties of the cloud. It is shown that in the presence of dust results in ice cloud forming at warmer temperatures and as a result a strong increase in outgoing long wave radiation is observed. This result is convincing and potentially important. The results from a number of satellite borne instruments are compared in an interesting and novel way. They are also able to show that low cloud effective temperatures in the dust laden and compared to the dust free periods were not simply a consequence of the large scale dynamical differences between these periods. This result is highly plausible based on other studies of the role of dust aerosol in heterogeneous nucleation. I, therefore, recommend publication after some revision.

Specific Comments

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How reliable is the results that the ice particles in the cloud are larger by night than by day ? I realise this observation is not unique but it would be useful to know more about whether this could be an artefact of the retrieval

Forming ice at warmer temperatures would generally result in the release of latent heat of fusion, this might be expected in some circumstances to cause the cloud to grow higher and so have a cooler cloud top temperature. The consequence of this is that had the clouds remained liquid then the tops would have been warmer and the outgoing thermal IR would be enhanced. This point needs clarification within the paper which seems to focus only on ice clouds.

## Technical Issues

The use of a large number of acronyms in the paper which are sometimes not defined when first encountered is confusing. I suggest using the full name rather more extensively.

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Interactive comment on Atmos. Chem. Phys. Discuss., 10, 763, 2010.

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