Atmos. Chem. Phys. Discuss., 12, C5661–C5662, 2012
www.atmos-chem-phys-discuss.net/12/C5661/2012/

Atmospheric Chemistry and Physics Discussions

Interactive comment on "No statistically significant effect of a short-term decrease in the nucleation rate on atmospheric aerosols" *by* E. M. Dunne et al.

Anonymous Referee #2

Received and published: 13 August 2012

The manuscript 'No statistically significant effect of a short-term decrease in the nucleation rate on atmospheric aerosols' by Dunne and co-workers presents interesting contributions to the ongoing discussion about the influence of GCRs on the climate. The authors use their many times published global model GLOMAP to test in a very simple setup the response of decreased nucleation rates for several days per month on different aerosol parameters. In my opinion this manuscript is written in a very reader-friendly way and complete in the scope of the journal Atmospheric Chemistry and Physics and should be published after minor corrections, which were given already in detail by referee number one Jeffrey Pierce. Special the lecture on English grammar at the end was also for me very helpful.

For this reason I only have some small additions without listing up all the corrections recommended by Jeffrey. First the introduction presents a very interesting discussion on this topic but at the end I'm missing a paragraph about the aim of this manuscript. The authors have moved this to section 2 but there should be a couple of sentences at this place like it is supposed to be.

Page 15382, line 11: I believe that this paragraph relates to the binary nucleation mechanism but should be also mentioned. There should be also a statement at the end of this chapter that no ion-induced nucleation mechanism has been implemented in GLOMAP until now if this is the case otherwise the readers will not easily understand why this reduction of the nucleation rate was used.

One possible way of influencing the climate by GCR which was not mentioned in detail is the enhanced growth of new formed charged particles. I assume that no parameterisation for this effect was included in GLOMAP and should be at least mentioned in the discussion for a possible factor GCR could have on the aerosol parameters.

Interactive comment on Atmos. Chem. Phys. Discuss., 12, 15373, 2012.