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# ***Interactive comment on “Stratospheric aerosols from the Sarychev volcano eruption in the 2009 Arctic summer” by F. Jégou et al.***

**Anonymous Referee #1**

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## **1 General comments**

This paper presents an interesting study on stratospheric aerosol from a midlatitude volcano eruption based on the satellite and model study by Haywood et al. (2010) and balloon and ground-based measurements. It might be published after revision. I would recommend to separate the main conclusions focussing on the new combination of observations and model results from the last section and move parts of the discussion to the introduction.

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## 2 Specific comments

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In the abstract also the ground-based observations might be mentioned.

Please give more details in line 3621/16, to what refers the resolution here?

I suppose HadGEM2 is a general circulation model (or climate model, line 3622/2f). Do you mean liquid  $H_2SO_4$  (line 13)? I suppose calculated aerosol radiative heating does not feedback on dynamics because the model is nudged. Please address this explicitly (line 18). Shouldn't be MIMOSA also mentioned in the model description section? Why do you need two models? Usually PV can be also provided from a GCM (line 3630/9).

Please say more why the total  $SO_2$  used in the model differs from Figure 1 and other studies (section 3)

Is 'median' radius in this study the same as 'wet' radius in Kravitz et al. (2011)? In Kravitz et al. (2011) is a strong dependence of the wavelength conversion factor (Eq.1) on particle size. Is entire stratosphere defined in Fig.8 and line 3629/23 with a variable tropopause? Or troposphere and UTLS as given in caption? Here is a contradiction.

Soufriere Hills should be mentioned explicitly here (line 3638/8). Gaseous sulphuric acid in the lowermost stratosphere should be almost immediately converted to aerosol (line 3638/18).

## 3 Technical corrections

Please use days and months in Figures 1, 3 and 7.

Better use a logarithmic color scale instead of the irregular one in Fig.2 (or was it intended to reproduce Fig.3 of Haywood et al. (2010))?

In the caption of Fig.5 the unit is missing, longitudes instead of latitudes!

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There are typos in lines 3618/19 and 3622/9.

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