

## ***Interactive comment on “Modelling the effects of (short-term) solar variability on stratospheric chemistry” by R. Muncaster et al.***

**Anonymous Referee #2**

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Modelling the effects of (short term) Solar Variability on Stratospheric Chemistry by Muncaster et al.

General comments: a) the article should be shorter as the basic aim is the parametrization of the stratosphere composition, in particular in the introduction where is discussed the 11-year and the 27-day rotation effects on the atmosphere. Going directly to the subject would be useful. b) There are several numerical models of the SSI. The choice made here should be justified. c) For choosing a model which property is mainly required for the present study? Value of precision and/or accuracy taking into account the wavelength domain to carry out the calculations of the stratosphere composition. d) The conclusion points out that the results of the study are based on a unique SSI model (Lean). It is true that the results will have a more general validity if similar results

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were also obtained with another model or directly with SSI data. e) In the introduction, several numerical simulations are listed using 1D, 2D and 3D models and providing different responses even in the tropical regions. Have you analysed the cause? Is it due to different solar inputs, or specific situations for example? f) Section 4 deals with daily random variability, could you explain more clearly the aim of this section? g) On line 41, the sentence starts by “The solar variability...eleven solar cycle... 27-day rotation period of the Sun.” It is more correct to write “The solar irradiance variability... “as the irradiance varies with the 27-day periodicity due to rotation and not to an internal mechanism as the 11-year solar cycle.

Results

Table 2 gives the percentage change of composition for several species after 5, 10 days . . . . What was the initial SSI change for example at 200 nm?

Now, a reader wishing to use the numerical results of your study for a certain level of solar activity change, how, he will proceed? Is it possible to provide a percentage of composition change for a given SSI variability at a wavelength of reference (for example 200 nm)?

Minor details

The terms “on line and off line” (line 16) have to be explained as all readers are not expert in the field of simulation, but interested by the results.

Figures 4 and 5 are difficult to read as the lines are very close to each other. On lower Figure 9, the two colors are very close (on my copy!).

Conclusion The article is interesting, but it would be more attractive by being shorter and written for readers not especially expert in the field of numerical simulation. In particular, means to access to the composition variability as a function of SSI variability should be provided if possible. This being taken into account, the paper has to be published.

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