

## ***Interactive comment on “Measurement from sun-synchronous orbit of a reaction rate controlling the diurnal NO<sub>x</sub> cycle in the stratosphere” by J. C. Walker and A. Dudhia***

**Anonymous Referee #2**

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### **1 General comment**

This paper presents an original method to use satellite observations to derive the reaction rate of  $\text{NO}_2 + \text{O}_3$  and then to evaluate values frequently published by JPL gathering laboratory studies. These values are commonly used by atmospheric chemical models. Therefore, it is of primary importance to assess the validity range of the recommended values, especially for a reaction that controls the nitrogen budget within the stratosphere and its particular environment.

This paper is well written and structured and certainly deserves publication.

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Anyway, the authors should be more ambitious: it is a little bit frustrating that the large amount of available satellite data is only reduced to single curves.

It would be interesting for each pixel, to use the temperature to calculate the reaction rate from JPL values, and to repeat the same calculation by their method, allowing to draw maps of correlation between both (or other statistics) and to infer where/when the agreement fails, probably opening new questions.

### **2 Corrections**

- Enlarge figures (especially 3 to 8) to make them readable
- p 24597, li 17: remove 'where M is any molecule'. Already defined
- p 24602, li 21: the study from Cox and Coker (1983) should be cited, as in Table 1
- p 24603, li 14: remove double 'the'
- from p 24609 to p 24611 (references): each reference ends with a dummy code or several. Remove
- p 24609, li 27: replace 'Ravishnkara' by 'Ravishankara'
- p 24611, li 28: add 'May R.D.' among the authors