

## **kCARTA : A fast pseudo line-by-line radiative transfer algorithm with analytic Jacobians, fluxes, Non-Local Thermodynamic Equilibrium and scattering for the infrared**

by DeSouza-Machado et. al.

We thank the anonymous referees for their detailed read of the paper and providing introspective comments, many of which have resulted in changes to the revised version of the manuscript. In particular we have improved the accuracy of the computed kCARTA radiances by changing our default options (now linear-in-tau, higher resolution spectral database in the 15 um region). This update has already been pushed to github. We have also shortened the paper by removing the sections describing comparisons between the HITRAN/GEISA/CO<sub>2</sub> line-mixing databases, and the impact of spectroscopic uncertainties on TOA radiances. This has been replaced by a section where we compare kCARTA versus LBLRTM TOA radiances.

Below we detail our responses to their individual concerns. For ease of review, we type-faced the reviewers questions in blue. When we refer to pages and line numbers in our answers, the context should make it clear whether we are talking about the original manuscript or our current revised manuscript.

### Reviewer 3

#### *Specific comments*

1) This paper describes a particular incarnation of kCARTA which the authors are making available. It would be very helpful to have a version identifier for the version described in the paper, and perhaps further identification, if possible, of which previous versions have been widely used. This is particularly needed in the paragraph beginning at Line 132, where the phrase “we now use” is unclear as to which previous version is obsolete.

In Appendix A we now explicitly mention that SRCv1.21, together with HITRAN 2016 and LBLRTM12.8 for CO<sub>2</sub>,CH<sub>4</sub> is used for the latest coefficients for the SARTA v2.01 (2019) versions for AIRS, CriS and IASI. In the same location we also clarify that we generate a new compressed database every 4 years (roughly within a year of a new HITRAN release)

#### Typographical errors:

Line 28, add comma after “process”

Fixed

Line 59-60, mismatched parentheses

Fixed

Line 158, “Schwarzschild” is misspelled

Fixed

Line 163, “radiation propagating” are both misspelled

Fixed

Line 171, remove the extra comma

Fixed

Line 242, unmatched bracket

Fixed

Line 243, “again” misspelled

Fixed

Line 322, remove comma after “i”

Fixed

Line 334, mismatched parentheses

Fixed

Line 335, coming “from” all

Fixed

Line 493, “cloudy” should be “cloud”

Fixed

Line 536, “A.B.” should be Boynard, A.

Fixed

Line 536, “P.M.” should be Pommier, M.

Fixed

Line 536, “A.R.” should be Razavi, A.

Fixed

Line 537, “Chemm” should be “Chem”

Fixed

Line 546, “Iancono” should be “Iacono”

Fixed

Line 580, “humidity” misspelled

Fixed

Line 584, list of authors is incomplete, at least add et al.

Fixed

Line 613, “I.E. G.” should be “Gordon, I.E.”

Fixed

Line 632, “Wm.” should be removed

Fixed

Line 649, “Karlsruhe”, not “Karlsruhr”

Fixed

Line 649, this link is dead. I find the paper at [https://www.imkasf.kit.edu/downloads/SAT/kopra\\_docu\\_part02.pdf](https://www.imkasf.kit.edu/downloads/SAT/kopra_docu_part02.pdf)

Fixed