Geosci. Model Dev. Discuss.,
https://doi.org/10.5194/gmd-2018-216-SC1, 2018

Geoscientific Model Development Discussions

Interactive comment on "A benchmark for testing the accuracy and computational cost of shortwave top-of-atmosphere reflectance calculations in clear-sky aerosol-laden atmospheres" *by* Jeronimo Escribano et al.

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Received and published: 2 October 2018

This seems to be a nice inter-comparison exercise. However, in my view, the manuscript could benefit from a few additional citations, that would provide a deeper literature review and better illustrate the scope of the current work in the context of what has been done so far.

Regarding Rayleigh scattering benchmarks, you might want to include this additional reference:

Natraj, V., and J. W. Hovenier (2012), Polarized Light Reflected and Transmitted by Thick Rayleigh Scattering Atmospheres, Astrophys. J., 748(1), 28, doi: 10.1088/0004-637X/748/1/28.

The following review paper might be relevant:

Natraj, V. (2013), A Review of Fast Radiative Transfer Techniques, in Light Scat. Rev. 8, 475–504, Springer: Berlin, doi:10.1007/978-3-642-32106-1_10.

There are several publications from our group on PCA-based fast RT:

Somkuti, P., H. Bösch, V. Natraj, and P. Kopparla (2017), Application of a PCA-Based Fast Radiative Transfer Model to XCO2 Retrievals in the Shortwave Infrared, J. Geophys. Res., 122(19), 10268–10287, doi:10.1002/2017JD027013.

Kopparla, P., V. Natraj, et al. (2017), PCA-Based Radiative Transfer: Improvements to Aerosol Scheme, Vertical Layering and Spectral Binning, J. Quant. Spectrosc. Radiat. Transfer, 198, 104–111, doi:10.1016/j.jqsrt.2017.05.005.

Kopparla, P., V. Natraj, R. J. D. Spurr, R.-L. Shia, Y. L. Yung, and D. Crisp (2016), A Fast and Accurate PCA Based Radiative Transfer Model: Extension to the Broadband Shortwave Region, J. Quant. Spectrosc. Radiat. Transfer, 173, 65–71, doi:10.1016/j.jqsrt.2016.01.014.

Spurr, R. J. D., V. Natraj, C. Lerot, M. Van Roozendael, and D. Loyola (2013), Linearization of the Principal Component Analysis Method for Radiative Transfer Acceleration: Application to Retrieval Algorithms and Sensitivity Studies, J. Quant. Spectrosc. Radiat. Transfer, 125, 1–17, doi:10.1016/j.jqsrt.2013.04.002.

Natraj, V., R.-L. Shia, and Y. L. Yung (2010), On the use of Principal Component Analysis to Speed up Radiative Transfer Calculations, J. Quant. Spectrosc. Radiat. Transfer, 111(5), 810–816, doi: 10.1016/j.jqsrt.2009.11.004.

Natraj, V., X. Jiang, R.-L. Shia, X. Huang, J. S. Margolis, and Y. L. Yung (2005), Application of Principal Component Analysis to High Spectral Resolution Radiative Transfer: A Case Study of the O2 A Band, J. Quant. Spectrosc. Radiat. Transfer, 95(4), 539–556, doi: 10.1016/j.jqsrt.2004.12.024.

Finally, these publications on fast RT models could be cited:

Spurr, R. J. D., and V. Natraj, (2011), A Linearized 2-Stream Radiative Transfer Code for Fast Approximation of Multiple-Scatter Fields, J. Quant. Spectrosc. Radiat. Transfer, 112(16), 2630–2637, doi: 10.1016/j.jqsrt.2011.06.014.

Natraj, V., and R. J. D. Spurr (2007), A Fast Linearized Pseudo-Spherical Two Orders of Scattering Model to Account for Polarization in Vertically Inhomogeneous Scattering-Absorbing Media, J. Quant. Spectrosc. Radiat. Transfer, 107(2), 263–293, doi: 10.1016/j.jqsrt.2007.02.011.

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