## General Comments

This study appears to be an introduction to a new microwave radiative transfer package written in Python. The development of this package was motivated by the increasingly larger community of Python users. The authors expect that this package will be used for education and incorporated into other Python programs for radiative transfer computations. The paper includes (1) a comprehensive survey of currently available microwave radiative transfer models, (2) a concise description of the basic formulas in microwave radiative transfer computations, and (3) a number of examples of using this newly developed radiative transfer code. Although I am not young enough to choose Python as my primary programming language at present, I appreciate the effort authors put on developing this tool and I think this study fits the scope of *Geoscientific Model Development*. Overall, the paper is well written and easy to read. All of my comments below are straightforward to address and can be regarded as minor.

## Specific Comments

Lines 473-475. Section 4.2. Figure 5. Yes, for the 183 GHz water vapor absorption band, the three curves in Fig. 5 appear flipped with respect to those in Fig. 4. However, for the 50-70 and 118 GHz $O_2$ absorption bands, only the red curve (surface emissivity = 0.9) in Fig. 5 appears flipped; the green and blue curves (surface emissivity = 0.45) in Fig. 5 do not. It would be helpful if the authors provide an explanation of this feature. Another interesting feature shown in Fig. 5 is that in the 50-70, 118, and 183 GHz gas absorption spectral regions, all the three curves in Fig. 5 are close to each other. It would be wonderful if the authors can also provide an explanation of the insensitivity of simulated upwelling $T_B$ to surface emissivity and sensor viewing angle in these spectral regions.

Lines 497-498. Section 4.3. Figure 6. The legend of Fig. 6b is not very clear. What does "$\tau$ (wet+dry)" stand for? It would be better to introduce this notation in the figure caption. In addition, the authors present the gases that account for the absorption bands in the spectral range between 20 and 201 GHz shown in Figs. 4 and 5. The readers may also be interested in the gases that cause the absorption bands between 118 and 874 GHz shown in Fig. 6.

Lines 597-640. Figure 11 is a good example, but does it have something to do with the uncertainty covariance matrix estimation approach said to be incorporated into the PyRTLib?

## Technical Corrections

Line 252. The integral in Eq. (5) is from $s_{i-1}$ to $s_i$, not from $s_i$ to $s_{i+1}$. The RHS should be

$$B_f(T_{MR})e^{-\tau_f(0,s_i)}\left[1 - e^{-\tau_f(s_i,s_{i-1})}\right].$$

Line 359. Change "Ccenter" to "Center".

Line 466. "elevation angle" or "elevation angles"?

Line 482. “emissivity at” or “emissivity values of”?

Line 485. “elevation angle” or “elevation angles”? “emissivity at” or “emissivity values of”?

Line 519. What are “wave” water vapor lines?

Lines 541 and 548 and 552. Line 541 says 149 match-ups while lines 548 and 552 both say 153 match-ups.

Line 544. “Figure” of “Figures”?

Not sure if other users also meet the problem, but I could not succeed in running the RT package the authors developed on my machine. After the package was installed, I failed in executing the examples provided by the authors with the same following error message:

```
ModuleNotFoundError: No module named 'pyrtlib'
```

Under the virtual environment where the package was installed, I tried installing the package again using the command: *pip install pyrtlib* but did not change anything. The following message helped me gain some confidence that the package was successfully installed:

```
Requirement already satisfied: pyrtlib in xxx
```