

## **Response to Referee #2:**

The authors greatly appreciate the helpful comments of the two referees. In the following, we present our point-by-point responses to the Referee #2. The referees' comments are in blue italic and our responses are in black. We have made appropriate changes in the revised manuscript by taking the comments into account.

## **Overall evaluation:**

*The authors provide us a physical algorithm based on radiative transfer to derive the Precipitable Water Vapor (PWV) and Aerosols Optical Depth (AOD) from a pair of ground-based spectroradiometers, EKO MS711 and MS712. In their algorithm the water vapor band near water vapor band near 1370 nm as well as near 940 were also used to derive the PWV, this is very important for dry atmosphere, e.g. for very cold area such as Tibet or other high altitude plateau.*

*All my questions and concerns in my first review has been answered, and a new revised manuscript was submitted, I have no more concerns for this revised version except a few typo mistakes and language sentences. I agree it publishing in AMT after the revision.*

**Responses:** We greatly appreciate your valuable comments on our submitted manuscript. According to your comments, we have carefully revised the manuscript. The item-to-item responses to your comments are as follows.

### *Minor concerns:*

1. Line 31-33, *“MWPS measures the radiation emitted from the atmosphere by microwaves, yields a vertical profile of water vapor, which can then be integrated to give PWV, where aerosols have little effect, but this measurement is very expensive (Güldner and Spänkuch, 2001; J. and Güldner, 2013).”* should be rewritten as: *“MWPS measures the radiation emitted from the atmosphere by microwaves, yields a*

*vertical profile of water vapor, which can then be integrated to give PWV (Güldner and Spänkuch, 2001; J. and Güldner, 2013). The advantages of using microwave for PWV is that aerosols have little effect, but the disadvantage is that this kind of instruments is generally is very expensive”*

**Response:** Thank you for your comment. We have corrected the corresponding expression in the article according to your suggestion. (Lines 33-34)

*2. Line 39, the short name “PHOTOS” should be clearly mentioned the first time.*

**Response:** Thank you for your comment. We are sorry that we did not check the previous manuscript carefully enough, we have corrected the mistakes in the article and rechecked the spelling of the manuscript again.

*3. Line 89, it’s better to replace “based on this” as “therefore”*

**Response:** Thank you for your comment. we have made corresponding changes in line 112 of the article.

*4. Line 114-116 “When simulating spectral curves, the US standard atmospheric model was selected, regardless of clouds and aerosols, randomly inputted PWV of 0-0.5 cm and solar zenith angle of 10°-45°, and superimposed -1 %-+1 % noise on the simulated curves.” Should be rewritten to make it clear, maybe better written as: “In spectral simulations, the US standard atmospheric model was used with random PWV between 0-0.5 cm, and solar zenith angle of 10°-45°, regardless of clouds and aerosols. The simulated spectral plus +/-1% was used for retrieval.”*

**Response:** Thank you for your comment. We have corrected the corresponding expression in the article according to your suggestion. (Lines 155-158)