

# ***Interactive comment on “A new parameterization of the UV irradiance altitude dependence for clear-sky conditions and its application in the on-line UV tool over Northern Eurasia” by N. Chubarova et al.***

## **Anonymous Referee #3**

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The manuscript deals with imports subject. i.e., modeling biologically effective UV (BEUV) radiations reaching the ground level. The authors provide useful formula for accurate estimation of the BEUV height dependence. It could improve various presently used UV index forecast models run by national weather services. Thus, the manuscript fits well with the journal scope. The reviewer decision is to accept the manuscript with minor changes listed below.

Minor comments:

I.168 – the cloud effects are mentioned here but all the calculations are carried out for

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cloudless conditions. It was clearly stated by the authors. However, they recommend using the on line tool based on the proposed formula that could be used also for all-sky conditions. Thus they should comment on validity of this formula, especially “As” (albedo) term, for the partially cloudy conditions.

I.179. Angstrom exponent of 1.0 is proposed in the calculations. Authors found that “A” coefficients do not depend significantly on the aerosols characteristics. Probably we can use here any value of Angstrom exponent (the same concern other aerosols characteristics: ssa, asymmetry factor ) because A represents the relative value and the exponent value does not change with the altitude. Authors should comment on the selected aerosols values, which are proper for visible and UVA ranges, but not representative over UV-B range. For example, Angstrom exponent of 1 provides that AOD at 308 nm is about 10% larger than that at 340 nm but many authors suggested that Angstrom exponent in UVB range could be zero and even negative.

I.286.” we can see its satisfactory agreement . . .”. I can not see the mentioned agreement. It is better to calculate the exponent value, separately for the AERONET and LIVAS data, and next discuss the agreement with the Pamir/Tien Shan exponent.

I. 348.” The value  $r_{\text{bio}}$  has a relatively small dependence on altitude”. Exactly, b value is small but c is also small. Figure 5 shows that  $r_{\text{bio}}$  changes significantly (0.4 for  $H=0$  but 0.2 for  $H=8$  km). Thus, for me it is not so small change.

I.425-439. The noon dose is mentioned many times but it is not clear how long is the exposition?, 1 hour around noon? Please provide 1 MED value and the vitamin D3 threshold dose for photo-type II and IV used in the calculations.

I.433. Open body fraction for skin phototype IV of 0.25 and 0.5 on 15th January is highly unreliable during the winter sunbathing. Value of 0.10 here is much more probable.

I. 718. Fig.3. Here Angstrom exponent=1.3 but 1 was used previously in the text (I.179, I.253).

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