Response to the Editor decision: Reconsider after major revisions:

The authors have considered the reviewer comments. However one of the major comments addressed by one reviewer was the inclusion (or non-inclusion of AE and SSA changes and also cloud type related discussion).

More details on AE(=0) choice that seems not so reasonable, consideration of SSA changes and also some basic discussion on different cloudiness and types will provide more evidence on the validity of the method and the whole analysis."

The discussion of these problems was added to the new version of the revised manuscript:

"To account for the effects of aerosols, the daily-averaged AOD at 340 nm was used with an Ångström exponent (AE) of 0 across the UV range, while the other features were held constant. This approach is consistent with the homogenisation procedure for Belsk's UV measurements from 1976 to 2023, as proposed by Krzyścin et al. (2025). Our previous study examined Brewer and the Cimel Sun photometer measurements at Belsk and showed that AE was close to zero in modelling of erythemal irradiance (Jarosławski et al., 2003). This study also showed no wavelength dependence of AOD in the UVB/UVA (310–340 nm) range and even negative AE in the 310–320 nm range (see Fig. 6 of Jarosławski et al., 2003). In TUV simulations of the erythemal irradiance we use fixed other aerosols characteristics derived as the 2004–2023 climatological means based on the measured the Cimel Sun photometer values at 440 nm. Raptis et al. (2018) pointed out that variations in the single scattering albedo (SSA) in the UV range could be omitted in rural, pristine areas with low AOD values. Belsk appears to belong to this category, with a mean $AOD_{340\,nm}$ of approximately 0.3. TUV simulations of clear-sky noon erythemal irradiance, assuming an $AOD_{340\,nm}$ of 0.3 and an AE of 0, showed that changes in SSA from 0.82 to 0.96 (i.e. the minimum and maximum SSA averaged values for the 2004–2023 spring–summer seasons at Belsk) yielded variations in the noon erythemal irradiance of only about ±5% relative to the value obtained using the mean SSA value of 0.92 for this season.

Similarly, the effects of clouds on UV were parameterised using a limited number of proxies: the strength of attenuation of global solar radiation by clouds, as indicated by CI, SunDur and G. In addition, a constant surface albedo of 0.03 was used throughout the year. It cannot be excluded that many other characteristics of clouds influence surface radiance, e.g. liquid water content, optical depth, specific cloud types, their bases and tops, and multiple light scattering between clouds at different levels and between snowy ground and clouds. Long time series of such parameters were not available to us. However, the choice of aerosol and cloud proxies used in erythemal UV modelling ensures excellent agreement between the modelled and observed annual erythemal radiation (ERE), as shown in Fig. 6, where the smoothed modelled (GPR_{all}, blue solid curve) and observed (black solid curve) time series are almost superimposed." L. 448-468.

The structure of the discussion was changed to ensure that the section on uncertainty remained consistent.

The following references were added to the reference list:

Jarosławski, J., Krzyścin, J.W., Puchalski, S., and Sobolewski, P.: On the optical thickness in the UV range: Analysis of the ground-based data taken at Belsk, Poland, J. Geophys. Res., 108(D23), 4722, https://doi.org/10.1029/2003JD003571, 2003.

Raptis, P., Kazadzis, S., Eleftheratos, K., Amiridis, V., and Fountoulakis, I.: Single Scattering Albedo's Spectral Dependence Effect on UV Irradiance, Atmosphere, 9, 364, https://doi.org/10.3390/atmos9090364, 2018.