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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Relationship between erythema effective UV radiant exposure, total ozone and cloud cover in southern England UK: 1991–2015" *by* Nezahat Hunter et al.

Anonymous Referee #3

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The manuscript by Hunter et al is clearly written and well organized. The authors study the short- and long-term changes of the daily erythemal doses over Chilton relative to the changes of total ozone and cloudiness, using a very long record of ground-based UV measurements. The study is a good contribution for the UV community. However, there are some issues that have to be addressed prior to the publication of the study.

Page 2, lines 58 – 63: Quantification of the effect of each of these factors is not easy, because of the complex interaction between them and the solar UV radiation. For example, the effect of clouds changes depending on the presence of aerosols (and is different for different types of aerosols). At least a discussion pointing out these

complex interactions should be added here.

The authors treat the effects of changes in ozone and cloudiness on erythemal irradiance as linear and independent to each other. However, they are nor linear, neither completely independent to each other. I suggest that a short discussion explaining why the particular methodology was chosen and what are the limitations/uncertainties due to its use should also be added in the introduction.

Section 2.3 (Estimating trends): The authors have not taken into account the variations of QBO and solar cycle in the analysis. Both phenomena are periodical and affect the variability of total ozone and UV-B radiation. Since these phenomena affect the results of the study, their effect should be either removed or at least quantified. Another, useful information which should be added here is the treatment of gaps in the series i.e.: - Is there a minimum number of available days below which a month is not taken into account in the analysis? - What if some measurements are missing during a day? Is there any particular criterion used in order to include a particular day in the analysis?

Section 3: (Figures 1 and 3): How were the measurements outside the whiskers classified as outliers (i.e. which criteria were used in order to characterize a measurement outlier)? P5, L183: what does the word "corrected" means? How and for what was the monthly deviation corrected?

Section 4: The results presented in this manuscript are also in good agreement with the results of Fountoulakis et al (2016) ("Short- and long-term variability of spectral solar UV irradiance at Thessaloniki, Greece: effects of changes in aerosols, total ozone and clouds") where a turning point in the trends of UV irradiance is reported on 2006. Can the authors comment the similar behavior of UV radiation at the two sites (between which the distance is very long, and the climatological conditions differ importantly)?

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