

## **Dead time effect on the Brewer measurements of spectral UV irradiance and TOC: correction and estimated uncertainties**

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Brewer spectrophotometers are widely used to measure the solar spectral UV irradiance and the total ozone column (TOC). Although properly calibrated and well maintained instruments can perform accurate measurements, each Brewer has unique constructional and operational features, the effect of which has to be also taken into account in order to achieve high quality final products. Although Brewers are deployed worldwide for more than thirty years, there are still operational issues that are not fully understood. Dead Time (DT) is a measure of how long a photon counting circuit cannot count a second photon after a first photon has been detected. This is one of the Brewer characteristics that are not sufficiently investigated and documented, and it is debatable whether the applied corrections could be improved. The dead time is specific for each instrument and improper correction of the raw data for its effect may lead to important errors in the final products. In the context of the present study, the appropriateness of the methodologies used for the calculation of the DT and the correction of the final products has been investigated and the effect of errors in the DT used for the correction of measurements of spectral UV irradiance and TOC has been quantified. Additionally, new methods for the calculation of the DT are presented.