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The MeteoSwiss Brewer triad: 15 years of parallel measurements

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Arosa LichtKlimatisches Observatorium (LKO) is celebrating this year its 90 anniversary of continuous total ozone measurements. This data set has been built on a series of Dobson sun spectrophotometers measurements with contiguous or overlapping operation periods. In 1988, a first Brewer (B040) instrument has been set in operation at LKO. Since 1998, a triad of Brewer is operated in parallel to the Dobson instruments at Arosa with the initial goal to evaluate the possibility to substitute the Brewer for the Dobson as the LKO reference instruments. However, the collocated measurements of the two types of sun spectrophotometers have shown a systematic differences due to the different operative wavelengths. New ozone cross-section measurements and their temperature dependences allows to significantly reduce the discrepancies. Further characterisation of the Brewer and Dobson instruments are also studied in the current ATMOZ* project with a “metrology” type of approach.

In this contribution, the 15 years of data from the Arosa Brewer triad are analysed to evaluate the long term stability as well as the short term variability of these operational monitoring Brewer instruments. The regular services and calibration of the instruments proved to be important in particular at the initial period of measurements to correct defective part in the instrument. The results of this analysis show that Brewer instruments have a remarkable long term stability below 0.5% and the short term variability is within +/- 0.4%. No significant seasonal cycles in the difference between pairs of instruments are evidenced.

*<http://projects.pmodwrc.ch/atmoz/>