

Example datasets from PMOD/WRC Davos, Switzerland with the double Brewer B163 and QASUME II compared with the UVIOS model

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Figure 1 shows an example for a clear sky situation during the summer with nearly no cloud contamination, and the resulting good agreement between the instruments and the model. The median relative difference between UVIOS and Brewer 163 is 1.04. The mean difference is slightly larger at 1.08 with a standard deviation of 18%, due to the occasional clouds which produce significant discrepancies.

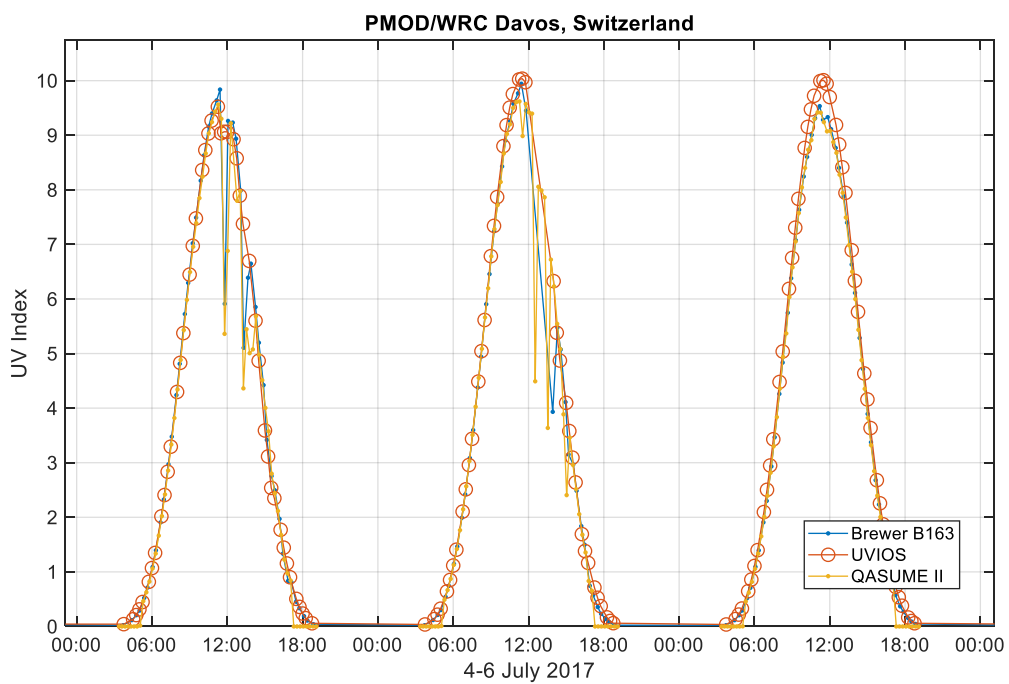


Figure 1 UV Index from 4 to 6 July 2017 from measurements (Brewer B163 and QASUME II) and from the UVIOS model.

Figure 2 shows some example conditions with scattered clouds. Due to the different spatial scale of the UVIOS model and viewing conditions, the single point comparisons can differ significantly. See for example the morning of 14 July with measured UV index around 2 and modelled UV index by UVIOS between 4 and 9.

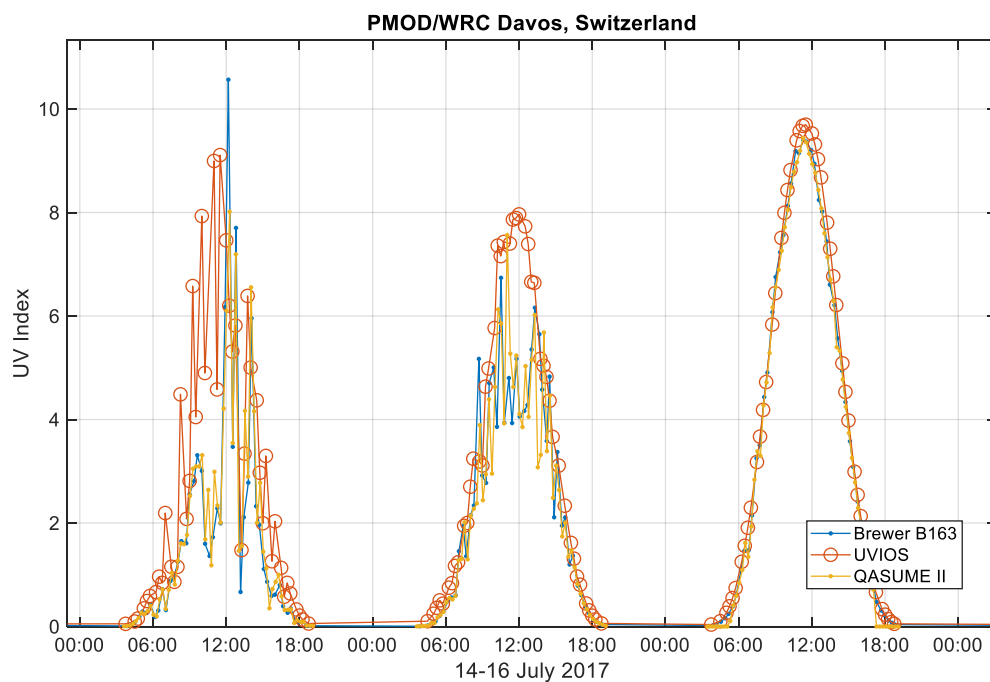


Figure 2 UV Index from 14 to 16 July 2017 from measurements (Brewer B163 and QASUME II) and from the UVIOS model.

Figure 3 shows UV index between the model UVIOS and Brewer B163 for winter conditions, with high albedo on the ground and in the surrounding area.

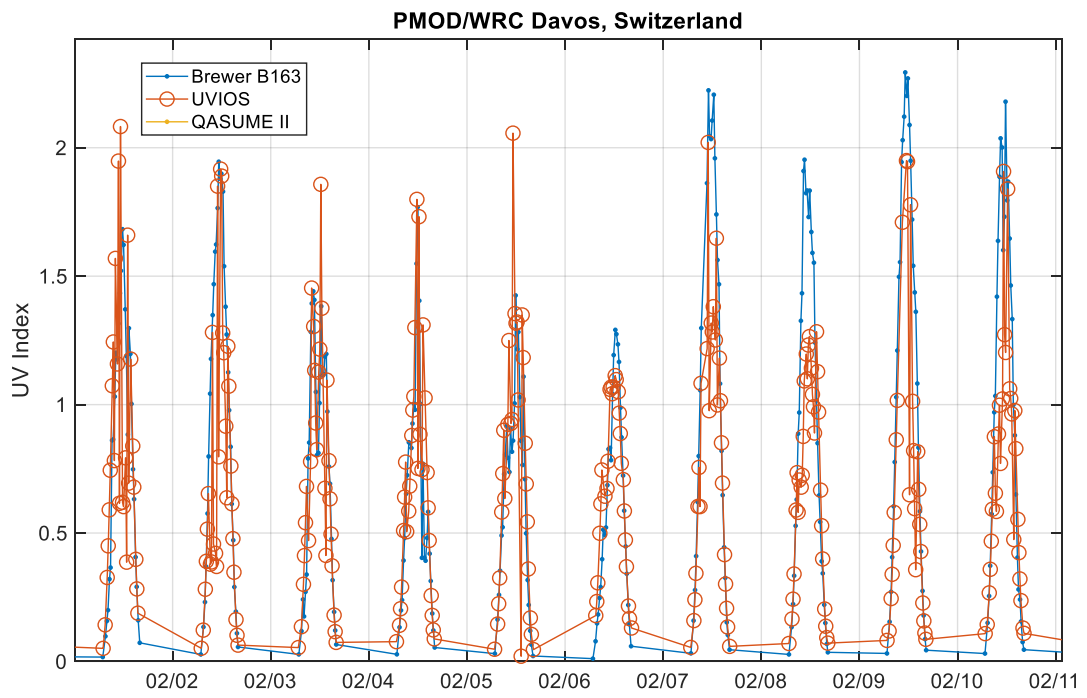


Figure 3 Same as before, but for winter conditions with snow on the ground. Data is from 2-10 February 2017. Only ground based measurements from Brewer B163 are available for this period.

Another example in spring with excellent agreement during clear sky (8, 9 April) and scattered cloud conditions (5 April), but also large discrepancies (6, 7 April).

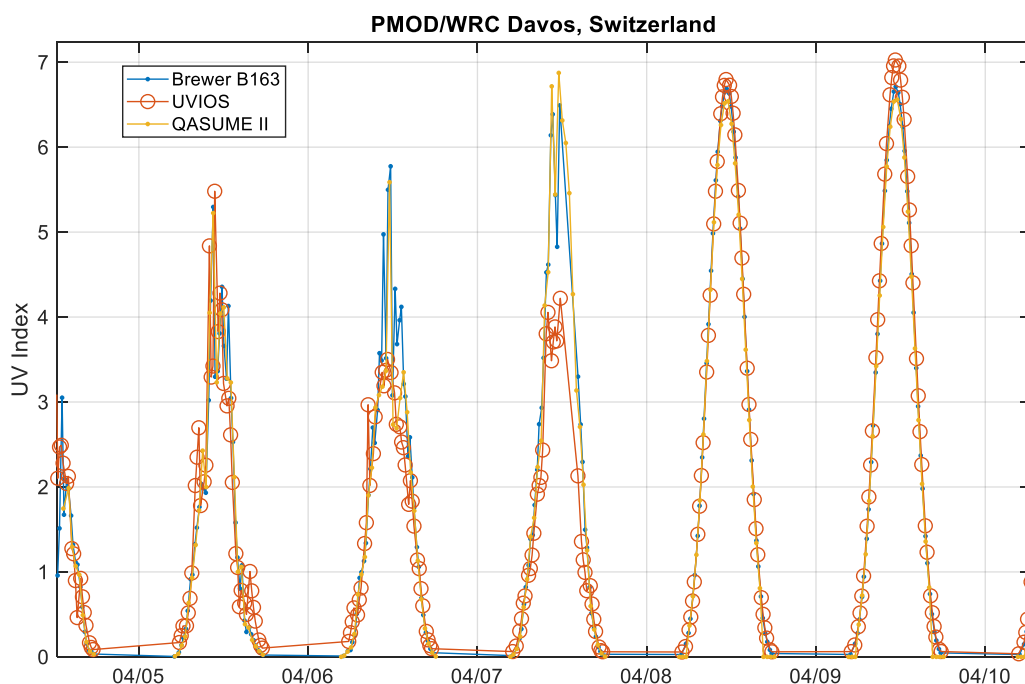


Figure 4 UV Index from 5 to 10 April 2017 from measurements (Brewer B163 and QASUME II) and from the UVIOS model.

The overall comparison between the model UVIOS and Brewer B163 for the whole period is shown in the histogram plot in Figure 5 for coincident measurements and model data within a 5 minute window. The average difference of 0.14 UV index is excellent, and the standard deviation of 0.85 UVindex even considering the periods with clouds is also remarkable. The 95% coverage of the residuals range between -1.4 to +2.5 in UVindex.

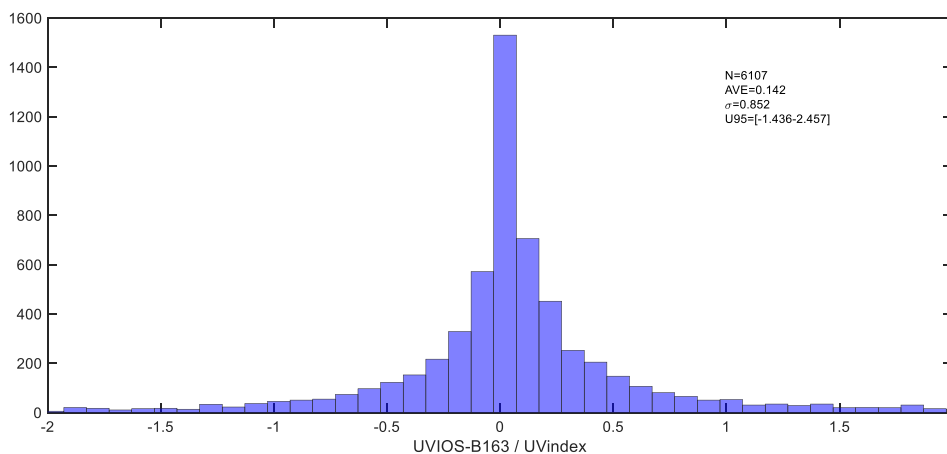


Figure 5 Histogram of differences in UV index between the model UVIOS and Brewer B163 for coincident measurements in a 5 minute window.