

S8-6 Narrow-band and widely tunable radiance source for the calibration of spectral imaging instruments [Keynote]

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Calibration of spectral imaging instruments is a prerequisite for many applications, in particular in the field of Earth observation. In this contribution we will present a novel traceability route to calibrate spectral imaging instruments, based on a tunable radiance source that is referenced to a primary detector standard. This method offers several advantages compared to the traditional method based on an FEL lamp and a diffuser, which has a very low radiance level in the UV wavelength range and suffers spectral and spatial stray light. Moreover the FEL lamp has a very limited lifetime in terms of burning hours. Our radiance source is based on an optical parametric oscillator (OPO) and an integrating sphere and is calibrated with the reference detector over the ultraviolet/visible spectral range with an uncertainty of <1%. To demonstrate the performance of this approach we have calibrated a CubeSat spectroradiometer for radiance over its operating range from 370 nm to 480 nm. As a validation, the instrument has also been calibrated with a traditional setup based on a diffuser and an FEL lamp. Both routes show good agreement within the combined measurement uncertainty. The OPO-based approach allows for higher radiance levels, in particular in the UV wavelength range, which significantly contributes to the lower uncertainty in this range. In addition, the novel method offers some other advantages: it directly allows for wavelength calibration and characterization of the instrumental spectral response function and stray light effects. This could reduce calibration time and cost.