

# Libya-4 Rayference Calibration reference: application to S3A calibration verification

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## Abstract

Libya-4 is a widely recognised CEOS calibration site used to monitor optical sensor drift, sensor cross-calibration but also as an absolute calibration reference. For that latter purpose, Rayference has established an absolute calibration reference composed of simulated top-of-atmosphere bidirectional reflectance factor between 300 nm and 2500 nm at 1 nm spectral resolution for any viewing and illumination zenith angles between 0° and 70°. This site is composed of oriented sand dunes and require therefore to average the observations over areas ranging from 10 km x 10 km up to 100 km x 100 km. Four different radiative transfer models are used for the simulation of the absolute calibration reference. The numerical uncertainties of these models significantly contribute to the overall uncertainty of this calibration reference which has been established with the comparison against well-calibrated instruments. The current relative accuracy of our calibration reference is estimated to be about ±2.1%. The reduction of these uncertainties requires the development of a new generation of radiative transfer models based on state-of-the-art computer graphics technics such as Eradiate.

The accuracy of our Libya-4 calibration reference will be evaluated against well-calibrated radiometers and will be applied for the verification of the S3A/SLSTR reflective band calibration.

**Keywords** - Fields campaigns / In-situ measurements / FRM