27. Antarctic Pseudo-Invariant Reference Sites for IRIDE Radiometric Calibration and Polar Earth-Observation Consistency

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Optical Earth observation at high latitudes, essential for monitoring the polar cryosphere, is where sensor radiometry is least verified, because conventional vicarious-calibration sites are low-latitude deserts. Motivated by the IRIDE constellation, whose Multispectral (MS) payload requires an independent radiometric reference, we develop a vicarious-calibration pipeline on Sentinel-2 as a proxy and characterise Dome C (East Antarctic plateau) as a pseudo-invariant calibration site. Level-1C top-of-atmosphere reflectance is compared with the 6SV2.1 radiative-transfer code over 399 austral-summer acquisitions (2018–2025). The per-band gains are 1.061 (B2), 1.038 (B3), 1.025 (B4) and 0.942 (B8), with an expanded uncertainty (k = 2) of 2.2–2.5 %, dominated by the assumed surface reflectance. A drift of the gain with solar zenith angle, caused by the Lambertian surface assumption, is removed by a Ross–Li bidirectional reflectance normalisation. Dome C proves temporally stable, and the pipeline is ready to be transferred to IRIDE MS.