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Knowledge of cloud location in near infrared (NIR) imagery is of interest to the meteorological community given its greater spatial resolution compared to longwave infrared and its potential nighttime applications. This method consists of an algorithm that can be employed by multiple instrument platforms. It analyzes changes between satellite image radiances and a seasonal synthetic background radiance image. The NIR sensor bands of the Sentinel-2 MSI and VIIRS satellite instruments are used to evaluate the performance of a monochromatic change detection technique designed to locate areas of cloud cover. VIIRS imagery is examined for its higher temporal resolution compared to Sentinel-2; whereas, Sentinel-2 imagery is examined for its higher spatial resolution. Background images are constructed either manually or algorithmically using a first-guess image. Observed and background images are differenced based on user-defined radiance, size, and shape thresholds. Pixels that meet these thresholds in the first algorithm are flagged as cloud cover. Output is compared to operational cloud masks that rely on multispectral techniques. Findings indicate that the developed algorithm identifies cloud cover above the specified size threshold well, but optically thin clouds and fresh snow still present limitations.