Destriping algorithm for improved satellite-derived ocean color product imagery

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While modern multi-detector radiometers (such as VIIRS-SNPP and MODIS-Aqua) offer improved image resolution and signal-to-noise ratio among other performance benefits, multi-detector arrangement in a whisk-broom scanner design gives rise to striping in satellite imagery due to various sources, which cannot be perfectly corrected by sensor calibration. Striping is more prominent in ocean color imagery, where it can strongly distort image gradients. Recently, Bouali and Ignatov (2014) [J. Atmos. Oceanic Technol.*,* **31**, 150–163 (2014)] introduced a new approach to remove relatively small detector performance related striping from thermal infrared bands (TOA radiances) for improved sea surface temperature data. We show that this methodology, with appropriately chosen parameters and adjustments, can also be applied to remove striping of much larger variance from the solar reflective band data. Specifically, we modify and apply this new approach to remove striping from satellite-derived normalized water-leaving radiance spectra *nLw*(*λ*) (not TOA radiances) obtained from solar reflective bands. The results show a significant improvement in image quality for both *nLw*(*λ*) spectra and *nLw*(*λ*)-derived ocean biological and biogeochemical products such as chlorophyll-a concentration and water diffuse attenuation coefficient at the wavelength of 490 nm *Kd*(490). It is emphasized that destriping is only applied to *nLw*(*λ*) spectra, not *nLw*(*λ*)-derived products. While this work is focused on removing striping artifacts from moderate resolution whiskbroom scanner type sensor data, it is expected to be applicable to destripe imagery from higher resolution pushbroom scanner type sensors.

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