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AMT4SentinelFRM radiometric validation of Sentinel-3A OLCI

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The Atlantic Meridional Transect (AMT) programme has been one of the most valuable sources of high quality in situ measurements for remote sensing over the past 20 years. The Copernicus Sentinel Atlantic Meridional Transect Fiducial Reference Measurements Campaign (AMT4SentinelFRM) makes use of the AMT platform to provide high quality Fiducial Reference Measurements (FRM) to validate Sentinel ocean colour and sea surface temperature satellite products. In this work we use above water radiometric in situ data collected during the AMT26 field campaign (September-October 2016) for the validation of Sentinel-3A OLCI (Ocean and Land Colour Instrument). We employ pre- and post-cruise calibration to generate post-cruise uncertainty budgets for our optical instruments (HyperSAS and TriOS radiometers), to quantify the overall uncertainty of each FRM and to identify and correct for biases. Quality-control procedures are then defined to ensure FRMs are of accuracy compatible for satellite validation. To match the high quality of the in situ dataset, we implement a robust match-up procedure that takes into account homogeneity, quality and spatial variability issues. Finally, we perform a comprehensive accuracy assessment of Sentinel-3 OLCI level 2 remote sensing reflectances over a range of conditions. The FRM methodology presented here offers a clear advantage in the number and quality of match-ups over traditional techniques, providing a decisive tool for algorithm development and validation of satellite products for the Sentinel data streams.