TROPOMI’s potential for ocean applications

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The backscattered light from within the ocean carries information about surface ocean optical constituents, e.g., phytoplankton and the amount of light in the ocean. Global quantified insight in these parameters is important for estimating primary productivity and heat budget, and for a better understanding and modeling of biogeochemical cycles. Atmospheric sensors such as SCIAMACHY and GOME-2 have proven to yield valuable information on phytoplankton diversity, sun-induced marine fluorescence, and the underwater light field. As commonly used for the retrieval of atmospheric trace gases, the oceanic parameters are inferred from differential optical absorption spectroscopy combined with radiative transfer modeling. Within the ESA Sentinel-5p+ Innovation themes, we explore TROPOMI’s potential for deriving the diffuse attenuation coefficient, quantification of different phytoplankton groups and the fluorescence signal of phytoplankton. Here we present results on deriving the diffuse attenuation coefficient from the vibrational Raman scattering signal in backscattered radiances measured by TROPOMI. The diffuse attenuation coefficient describes how fast the incoming radiation in the ocean is diminished with depth. Retrieval results in three spectral regions covering the ultraviolet and blue region of the solar spectrum are presented and intercompared. In future, we will explore if information on sources of colored dissolved organic matter and ultraviolet-absorbing phytoplankton pigments can be inferred from these data sets.