



TROPOMI Aerosol Layer Height (ALH) recent developments

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The O₂-A band Aerosol Layer Height (ALH) product was newly developed for Sentinel 5P/TROPOMI. The product has been revised to produce new and consistent results fast.

So far, ALH data release has been limited, because of several unforeseen issues which needed to be addressed. Since November 2018 sparse data points have been processed and released, but the implementation of the ALH algorithm as foreseen in the development phase, based on line-by-line computations in the O₂-A band, was computationally very expensive, limiting a rigorous testing of the product. Therefore, a new atmospheric forward model was developed, based on a neural network estimation of the observed radiances and irradiances in the O₂-A band, which allow ALH retrievals which are up to three orders faster than the original algorithm. By retaining the original retrieval method, which is a standard optimal estimation procedure matching the ALH and the aerosol optical thickness (AOT), and estimating only the (ir)radiance in the forward model step using a neural network, the accuracy assessment was remained unchanged. With this implementation, ALH data can be derived for all cloud-free TROPOMI pixels in NRT, and the product can be reprocessed for testing and validation. The newly reprocessed ALH data are scheduled to be released in June 2019.

We will present the TROPOMI O₂-A ALH algorithm and the neural network approach in the forward model. This new version of the ALH product compares very well with the original implementation, with differences between the two versions well within the accuracy of the product. The latest results of the test and operational version will be presented. We will focus particularly on the Camp fires near Paradise, Ca. in November 2018, which provided a test case for the TROPOMI ALH product. During this intense wild fire, huge smoke plumes from several sources drifted over the Pacific Ocean west of the north American continent, on which several TROPOMI products could be tested, like UVAI, ALH and cloud products. Validation data was available from CALIOP/Calipso data, which will also be presented.