



## **The retrieval of aerosol properties and ground reflectance with the AATSR dual view algorithm**

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The retrieval of the optical properties of atmospheric aerosols is based on the measurement of earth reflectance by a satellite instrument. This is the so-called top-of-atmosphere (TOA) reflectance. The most common approach in the retrieval is to compare the measured and modeled reflectance. Both atmospheric and surface reflectance have to be taken into account when the TOA reflectance is modeled. It is usually assumed, at least in single view technique, that the surface reflectance is known a priori. Then the atmospheric reflectance due to aerosols can be varied to minimize the discrepancy between the measured and modeled TOA reflectance.

The AATSR instrument is the third in a series of along track scanning radiometers. The instrument is on-board the ESA ENVISAT satellite. It is originally designed to measure Sea Surface Temperature (SST) to high levels of accuracy and precision but the dual-view and multichannel features of the instrument enables other applications as well. The centre wavelengths of the AATSR channels are 0.555, 0.659, 0.865, 1.61, 3.70, 10.85, and 12.00  $\mu\text{m}$ . The instrument has two views: a near nadir one and a 55° forward looking one.

The AATSR dual view (ADV) algorithm for the retrieval of aerosol properties uses a special approach to handle the surface reflectance over land. It is assumed that the ratio of the nadir and forward surface reflectance is independent of wavelength. Thus, if the ratio can be determined at a wavelength, a formal connection between the nadir and forward modeled reflectance can be made enabling the retrieval of aerosol properties without any a priori knowledge of the surface reflectance. The nadir/forward surface reflectance relation, the so-called  $k$ -ratio technique, has been proven to work in principle.

The modeled atmospheric reflectance is a side product of the ADV aerosol retrieval. This reflectance can be used in connection with the measured TOA reflectance to compute the surface reflectance. The possible use of the retrieved surface reflectance as an ADV product is studied by comparing it to reflectance that is retrieved with another instrument.