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New method for radiation calibration of satellite sensors with high spatial resolution

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The traditional method to perform the radiation calibration of satellite sensors using the test site includes the measurements of the signal at the input of the calibrating satellite sensor and simultaneous field measurements of the atmosphere and surface parameters (albedo and radiance reflection coefficients of the underlying surface). The characteristics of atmosphere and underlying surface are used to compute the spectral density of the solar radiation at the input of the satellite sensor. For these calculations the altitude structure of aerosol-gaseous atmosphere is assumed to be known a priori. Beside the computations of the radiative transfer in the coupled system atmosphere-underlying surface are supposed to be performed with regards to the influence of the adjusted pixels contribution into the registered satellite signal from the test pixel. This influence exists because of molecular and aerosol scattering in atmosphere and as known is essential at the distances up to 5km.
We propose the new method to calibrate the satellite sensors of high spatial resolution. This method requires the registration of signals from two closely located test pixels and enables significantly simplify and improve the accuracy of the radiation calibration of satellite sensors. To implement this method one needs to measure the atmosphere optical thickness and albedo and radiance coefficients of two test sites. Compared with traditional calibration process, new method eliminates the need of a priori knowledge of the vertical structure of atmosphere, the necessity to calculate radiative transfer in the coupled system atmosphere-underlying surface and an additional allowance for the influence of the neighboring pixels in the signal registered by the satellite sensor. The simulation performed showed the use of this new technique provides noticeable improvement of radiation calibration of satellite sensors with high spatial resolution