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## Physical interpretation of the spectral radiative signature in the transition zone between cloud-free and cloudy regions

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**Abstract.** One-second-resolution zenith radiance measurements from the Atmospheric Radiation Measurement program's new shortwave spectrometer (SWS) provide a unique opportunity to analyze the transition zone between cloudy and cloud-free air, which has considerable bearing on the aerosol indirect effect. In the transition zone, we find a remarkable linear relationship between the sum and difference of radiances at 870 and 1640 nm wavelengths. The intercept of the relationship is determined primarily by aerosol properties, and the slope by cloud properties. We then show that this linearity can be predicted from simple theoretical considerations and furthermore that it supports the hypothesis of inhomogeneous mixing, whereby optical depth increases as a cloud is approached but the effective drop size remains unchanged.

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