

Interactive comment on “Physical interpretation of the spectral radiative signature in the transition zone between cloud-free and cloudy regions” by J. C. Chiu et al.

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We added one paragraph in Introduction:

There are a number of observations about the transition zone, although its definition and horizontal extent vary. From extensive analyses of aircraft in situ data and model simulations, Perry and Hobbs (1996) and Lu et al. (2003) found enhanced humidity ("halo"; or "cloud halo") around the cloud edge. The humidity halo typically extended 0.3–1.3 cloud radii from cloud edges for clouds having average width of 1–5 km (i.e., the extent of the halo was around 150 m – 3 km). Platt and Gambling (1971) reported the enhancements of lidar backscatter and downward infrared flux between clouds and 'visually' clear areas, and suggested that the enhancements were caused by increased

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humidity and aerosol swelling around cloud edges. The transition zone with enhanced lidar and radiometric signals could extend to 1-4 km away from the cloud boundary, consistent with what Su et al. (2008) found from airborne high spectral resolution lidar data (Hair et al., 2008). Koren et al. (2007) defined a transition zone that extended tens of kilometers and associated with unique microphysical and radiative properties of aerosols and clouds because of undetected clouds and humidified aerosols.

We added one sentence in Summary:

Unlike other studies (Platt and Gambling, 1971; Perry and Hobbs, 1996; Lu et al., 2003; Koren et al., 2007; Su et al., 2008), Regime 1 (i.e., the transition zone) has a width in the range of 50-150 m, and is defined strictly by radiative signatures of downwelling radiances measured by SWS.

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