Temporal and Spatial Variations in Mountain Reflectivity: Changing Multipath Effects on a Wideband UHF Radio Link in Mountainous Terrain

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The dominant route for RF power to reach deep mountain shadow zones at UHF and higher is through reflection from adjacent topography (Breton & Arcone, IEEE Int. Symp. Ant. & Prop, 2015; Lu et al, IEEE Trans. Ant. & Prop., 61(3), 2013). We present the results of long term measurements performed in the White Mountains of New Hampshire to characterize daily, weekly and seasonal changes in mountainside reflectivity for UHF signals. Measurements of the reflecting slopes include soil dielectric properties and leaf wetness records at two different elevations. The radiofrequency spectrum of a mountain-reflected digital television signal centered at 497 MHz was recorded over the course of several months in the field using ruggedized, solar-powered spectrum analyzers. Preliminary results recorded over two weeks in May 2016 (shown below) feature rapid changes in both reflected signal power and spectral character associated with freeze-thaw events on the reflecting slopes. Variations in the reflected signal spectrum suggest that mountain reflectivity is dominated by water and thus changes *spatially* as well as temporally during weather events, having a significant impact on the reflectivity of various mountain facets relative to each other, and thus on the multipath environment in mountainous terrain.