

Measuring visibility using smartphones

Jan Friesen (1,3), Raphael Bialon (2), Christoph Claßen (2), Kalman Graffi (2,3)

(1) Helmholtz Centre for Environmental Research - UFZ, CATHYD, Leipzig, Germany (jan.friesen@ufz.de), (3) Arab-German Young Academy of Sciences and Humanitie, (2) Heinrich-Heine-University of Düsseldorf

Spatial information on fog density is an important parameter for ecohydrological studies in cloud forests. The Dhofar cloud forest in Southern Oman exhibits a close interaction between the fog, trees, and rainfall. During the three month monsoon season the trees capture substantial amounts of horizontal precipitation from fog which increases net precipitation below the tree canopy.

As fog density measurements are scarce, a smartphone app was designed to measure visibility. Different smartphone units use a variety of different parts. It is therefore important to assess the developed visibility measurement across a suite of different smartphones. In this study we tested five smartphones/ tablets (Google/ LG Nexus 5X, Huawei P8 lite, Huawei Y3, HTC Nexus 9, and Samsung Galaxy S4 mini) against digital camera (Sony DLSR-A900) and visual visibility observations. Visibility was assessed from photos using image entropy, from the number of visible targets, and from WiFi signal strength using RSSI. Results show clear relationships between object distance and fog density, yet a considerable spread across the different smartphone/ tablet units is evident.