**MRMS Precipitation Estimates Using Specific Attenuation**

Stephen Cocks (OAR/NSSL/WRDD, Norman, OK)

Rainfall Estimation Via Specific Attenuation.

An algorithm using specific attenuation 'A' to estimate precipitation in pure rain has been developed using data from Dual Pol S-band radars. The technique is physically related to the amount of radar signal attenuation along a radial caused by liquid water droplets. The two key variables needed to obtain a rainfall estimate using 'A' [or R(A)] are the uncorrected reflectivity (Z) and the span of Differential Phase along a radial. The technique is sensitive to frozen precipitation; hence the algorithm uses numerical model data to determine the likely location of the melting layer in order to estimate precipitation below it. When hail is likely present precipitation rates are estimated using Specific Differential Phase [or R(KDP)].

A key parameter in estimating the specific attenuation fields, $\alpha$ (the net ratio of A-to-KDP), was found to be sensitive to tropical and continental rainfall regimes and offered the hope of improved quantitative precipitation estimate (QPE) performance in moderate to high end rainfall events. Using WSR-88D radar data collected from 37 radars on 56 calendar days, QPE using specific attenuation were generated and, in turn, compared to operational Dual Pol QPE estimates. The results indicated the new QPE generated performed better than the operational Dual Pol, particularly during moderate to high end precipitation events. Additionally, the new technique exhibited better performance in partial blockage regions.

The new technique has been integrated into the Multi-Radar-Multi-Sensor (MRMS) QPE algorithm where 'A' is used to estimate precipitation in pure rain, KDP where hail is likely and reflectivity, Z, within and above the melting layer. The new algorithm is currently undergoing testing and evaluation on the MRMS real-time research test bed and plans are for the product to be operational by the late 2017 or early 2018.