Toward a suite of cloud property retrieval algorithms for Cloud Sat: philosophy and recent progress

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Much progress has been made in recent years in the development of algorithms to treat data generated by millimeter cloud radars. These algorithms range from schemes to detect weak hydrometeor return arbitrarily close to the radar noise level to complicated multi-sensor schemes to derive cloud microphysical properties. All of these algorithms were designed for specific radar systems and often to treat targets of specific interest to the algorithm developer. Scientists on the cloudsat science team that have been tasked with the development and integration of algorithms are at the disadvantage that we have not yet seen data from any spaceborne millimeter radar system. Furthermore, we will not have the luxury of choosing a narrow range of meteorological targets on which to concentrate – our goal is to process operationally the entire continuous global data stream beginning with the very first radar reflectivity profile returned from orbit. Cloudsat algorithm development, therefore, requires careful consideration. We will discuss our emerging philosophy behind this algorithm development, and we will also describe and show examples from our most recent techniques applied to surface-based data. ARM's continuous millimeter radar data streams will be crucial to cloudsat algorithm development before launch and to validation after launch. We will show examples of cases and statistics derived from this continuous data stream and discuss our approach to algorithm validation.