# 5.18 QUANTIFYING ERRORS ASSOCIATED WITH POLARIMETRIC RADAR FORWARD OPERATORS

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Several polarimetric radar forward operators have been developed in the past decade; these forward operators have allowed for more thorough comparisons between observations from polarimetric weather radars and output from numerical weather models. Such comparisons can facilitate the assessment of microphysics schemes and are likely to prove useful for improving data assimilation and, subsequently, model analyses and forecasts. However, current microphysics schemes do not provide the full array of information needed to accurately calculate commonly used polarimetric radar quantities (e.g., differential reflectivity and co-polar correlation coefficient), requiring that those who use the forward operator to select a priori relations or make assumptions to obtain everything necessary to calculate the radar variables. This work examines the impacts of several of the most important assumptions that must be made including hydrometeor fall behavior (e.g., canting angle distributions), water distribution in mixed-phased hydrometeors, lookup table granularity, and effective dielectric constant models in an effort to provide more robust guidance and elucidate expected errors to users of these forward operators.