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Overview of the assimilation of microwave imagers and humidity sounders observations within clouds and precipitation

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Microwave observations are characterized by a very rich information content with respect to water in all its different states, from water vapor to condensed water mass. Various developments in the past decade, including major advances regarding radiative transfer, allowed the assimilation of microwave observations within clouds and precipitation. The international community gained a lot in understanding of the mechanisms which can lead to progresses onto forecasts with microwave cloudy and rainy observations, at various scales from large scale global forecasts to kilometric scales with mesoscale regional forecasts.

This presentation will attempt to review the use of the various microwave observing systems which have been experimented for all-sky assimilation and did or did not make it yet to an operational system. Impacts reported by several operational and research centers from the use of microwave imagers and humidity sounders will be summarized, with a particular focus on extreme events. Some current limitations and challenges of microwave assimilation will be discussed like the tuning of radiative properties of hydrometeors within observation operators. Finally, verification methods for measuring the progresses made through microwave all-sky assimilation will be discussed with a particular focus on precipitation forecasts.

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