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Mixed Gaussian-Lognormal Variational Data Assimilation

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Over the last decade there has been development at the Cooperative Institute for Research in the Atmosphere (CIRA) at Colorado State University (CSU) of different forms of variational data assimilation systems that are based upon using a multivariate probability density function that is a combination of a multivariate Gaussian and multivariate lognormal distribution. This combination distribution is referred to as a mixed Gaussian-lognormal distribution and retains properties of both distributions, but also allows the lgonormal component to affect the Gaussian random variables in the mode due to the definition of the mode of the lognormal distribution.
In this presentation we shall provide a brief overview of the mixed distribution and then present results with its application in the WRF-GSI system, along with the CIRA Data Assimilation Testbed's (CDAT) Gaussian fits all, logarithmic transform, and the mixed distribution based microwave brightness temperature CIRA Optimal 1-Dimensional Optimal Estimator (C1DOE) 1DVAR retrieval systems which is available in near real time for small limit areas at this time.