Mesonet Data Assimlation and Quality Control Challenges for the Real-Time Mesoscale Analysis (RTMA) System

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The Real Time Mesoscale Analysis (RTMA) system at NCEP[1] is a 2DVar assimilation system that includes surface observations from a wide variety of sources. Of particular interest are mesonet stations, which require special attention with respect to quality control. Many mesonet stations are sited in less than ideal environments, but often their observations still add value to the analysis. In addition, a lack of available metadata for mesonet stations can hinder the ability to make real time quality control decisions necessary for the RTMA.

Currently, static lists of usable (or non usable) mesonet stations are used for quality control. This is an attempt to expand upon these lists; creating dynamic uselists (or reject lists) which are based on stratified statistics. The hope is to find stations that are usable only in certain situations, and use those stations only in situations where it is appropriate to do so. Quality control lists will be presented based on observed wind direction (to identify stations where winds are partially obstructed) and local sun angle (to identify under or over exposed stations). These lists are based on the methods developed by Benjamin et. al[2] and Levine et. al[3], but are expanded to include different weather situations.

The lists are also used to infer metadata about specific mesonet sites where none is available. The quality control lists and metadata are used to identify which mesonet stations should be used in the analysis. The full quality control methodology, impact of the lists on the analysis, and potential new methods of using mesonet metadata will be presented.

References

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[2] Benjamin, S. G., W. R. Moninger, S. R. Sahm, and T. L. Smith. "Mesonet wind quality monitoring allowing assimilation in the RUC and other NCEP models" *22nd Conf Wea. Analysis Forecasting/18th Conf. Num. Wea. Pred.,* June 2007. (http://ams.confex.com/ams/pdfpapers/124829.pdf)

[3] Levine, S., S. M. Lazarus, M. Splitt and M. Pondeca. "The development and utility of a database of mesonet wind observations for use in the RTMA system" *15th Symposium IOAS-AOLS*, January 2011. (http://ams.confex/com/ams/91annual/webprogram/manuscript/Paper181976/AMS Poster Manuscript v011311.pdf)