Variational Bias Correction of Conventional Observations

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Variational bias correction of observations (VarBC) was originally developed at NCEP as part of its Spectral Statistical Interpolation analysis system [1] and subsequently implemented in ECMWF's Integrated Forecast System [2]. VarBC was designed to automate and optimize bias adjustments for the growing volume and variety of satellite radiance measurements that are used in global numerical weather prediction. It has also been successfully applied in modern reanalyses to improve the consistency and homogeneity of climate data sets [3].

This presentation will describe efforts at ECMWF to extend the VarBC approach to handle in-situ observations from conventional instruments. These include the development of temperature bias corrections for aircraft observations recently implemented in the operational forecast system. We will also discuss ongoing work in the reanalysis context to address biases in observations of wind- and temperature from early radiosondes, and surface pressure observations from land stations, ships, and buoys.

References:

[1] J. Derber and W. Wu. "The Use of TOVS Cloud-Cleared Radiances in the NCEP SSI Analysis System," Monthly Weather Review, vol. 126, no. 8, pp. 2287–2299, August 1998.
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[3] D. Dee, and S. Uppala. "Variational Bias Correction of Satellite Radiance Data in the ERA-Interim Reanalysis." Quarterly Journal of the Royal Meteorological Society, vol. 135, no. 644, pp. 1830–1841, October 2009.