ARM Data Quality Office Update 2008

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1. Plotting Tools

▪ Interactive data plotting via NCVweb allows data quality analysts to select a specific time period and multiple variables to be displayed on a single plot. This is helpful for identifying trends and particular detail otherwise undetectable by looking at daily plots (Fig. 1).

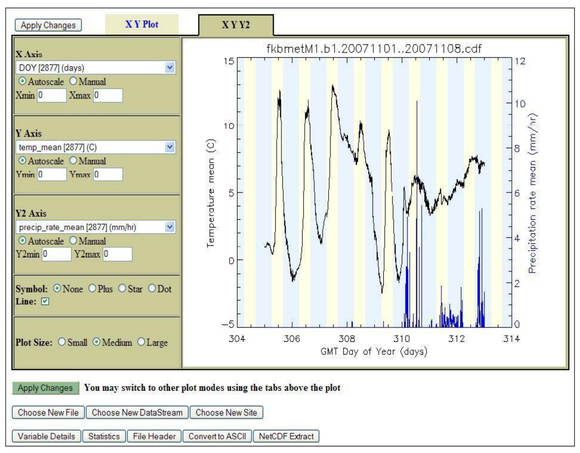

Fig. 1. NCVweb interactive data plotting tool found at dq.arm.gov.

▪ The Plot Browser (Fig. 2) allows users and data quality analysts to access an archive of plots. Up to 30 days of multiple instrument plots can be viewed at once. Users can select their preferred viewing method, including thumbnails, and also can apply filters to narrow down the amount of viewing information desired.

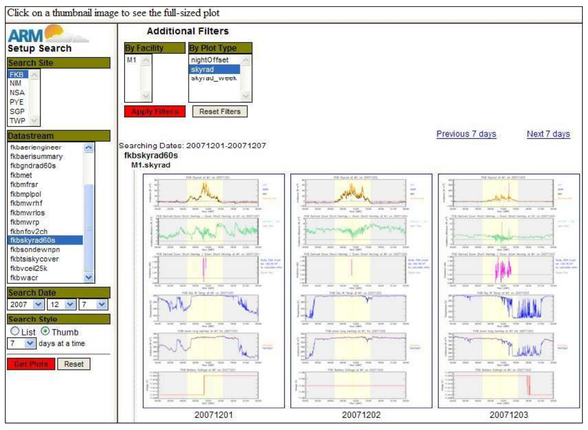

Fig. 2. Plot Browser display of multiple days of radiometer plots.

2. Creation and Use of Long Time-Series

▪ The Data Quality Office is developing tools to facilitate analysis of long time series data to better detect data issues not detectable through daily analysis. One example has involved extracting a slice of all NSA Barrow MMCR mode 3 reflectivity at 2000m, represented by the red horizontal lines in Fig. 3.

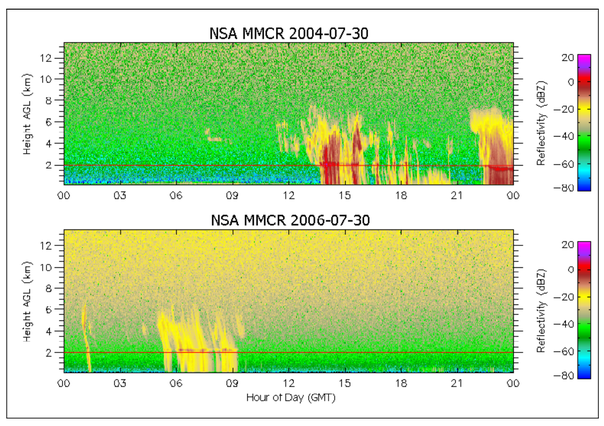

Fig. 3. MMCR general mode reflectivity from NSA Barrow.

▪ Fig. 4 shows a 2000m horizontal slice of general reflectivity over 4 years of Barrow data. Note how the minimum reflectivity changes, indicating possible hardware issues. This plot also shows how the range of reflectivity values have changed over time, indicating a distinct change in the ability of the radar to detect clouds.

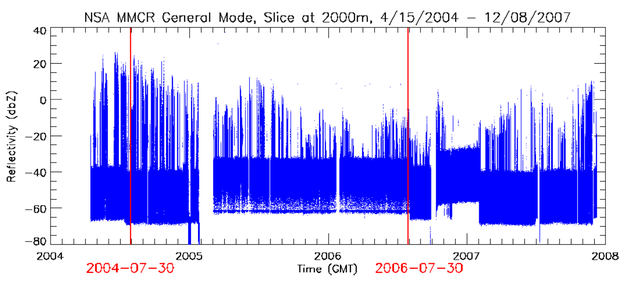

Fig. 4. 2000 m slice of general mode reflectivity from 2004-2007.

3. ACRF and the Oklahoma Mesonet

▪ A comparison between relatively sparse and dense networks was performed using temperature and relative humidity observations recorded by ARM SGP Climate Research Facility SMOS and Oklahoma Mesonet (OKM) sensors for the time period 2004-2006.

▪ The Pearson correlation coefficient (ρ) and root-mean square difference (RMSD) were computed using these variables from both ARM/ARM and ARM/OKM station pairs.

▪ ρ and RMSD were plotted against the distance between stations for the sparser Kansas domain and two dense Oklahoma domains. Figs. 5 and 6 show plots of ρ versus distance for the dense Oklahoma domain centered at E27 (results from the sparse Kansas domain are overlaid for reference).

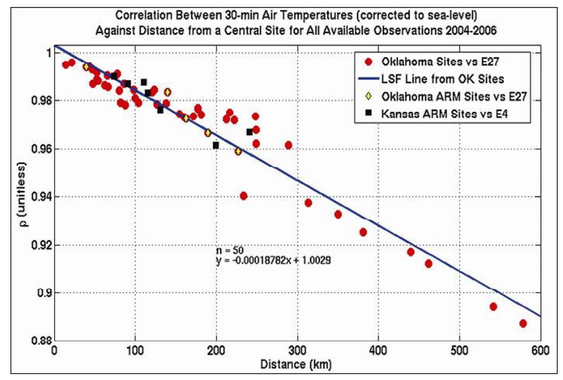

Fig. 5. ρ, calculated from temperature observations at ARM and OKM sites, versus those at E27 during 2004-2006, plotted as a function of distance from E27.

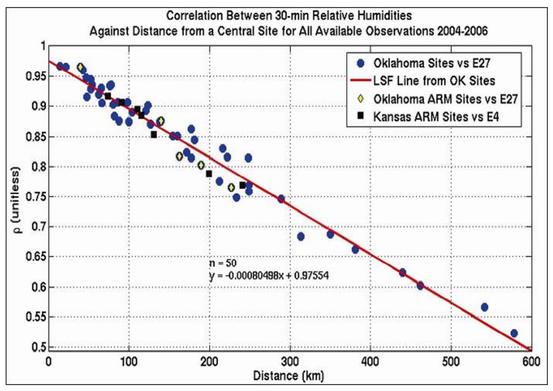

Fig. 6. ρ, calculated from relative humidity observations at ARM and OKM sites, versus those at E27 during 2004-2006, plotted as a function of distance from E27.

4. Assessment Guidance Database

▪ The DQ Wiki page is a valuable guidance resource for data quality analysts. Each instrument has its own page, containing examples of known problems or issues (Fig. 7 shows part of the SMOS page).

▪ These help when a problem arises and an analyst must issue a Data Quality Problem Report (Fig. 8), as he/she is then better able to identify a problem cause. This in turn reduces troubleshooting time and leads to quicker problem resolution.

▪ Instrument mentors contribute to the Wiki page, enhancing its value for DQO analysts. Each page was developed with the help of the relevant Instrument Handbook and interaction with the mentor. The Wiki is a living document that allows us to document new issues that arise through routine data analysis.

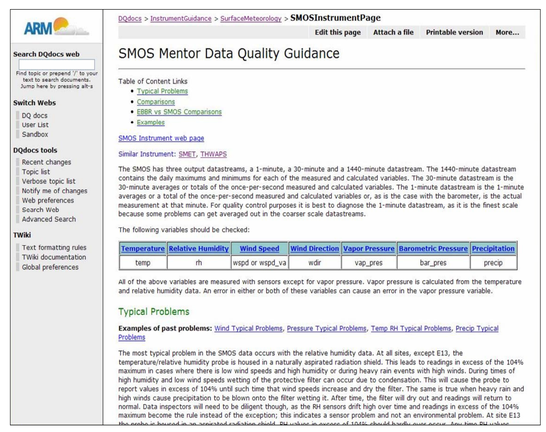

Fig. 7. DQ Wiki guidance excerpt for the SGP SMOS.

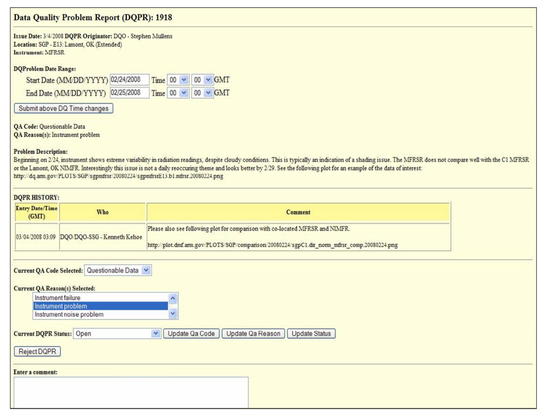

Fig. 8. Sample Data Quality Problem Report.