Improvements To and Status of the Data Quality Health and Status System

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Introduction

The Atmospheric Radiation Measurement (ARM) Data Quality Office (DQO) has made a number of improvements and additions over the past year to its main tool for inspecting and assessing ARM data quality—the Data Quality Health and Status (DQ HandS) system (http://dq.arm.gov/). Among the improvements and additions, some of which are shown below, are the inclusion of ARM Mobile Facility (AMF) data; a new plot browser to facilitate the viewing of DQ HandS diagnostic plots; an improved method for writing and databasing weekly data quality assessment reports; a new automated daily alert, an improved method for searching ARM report databases (see Doty and Wagener's abstract in this proceeding); addition of more instrument and value-added products output, and creation of a development version of DQ HandS that allows the present system to become a true production tool.

ARM Mobile Facility Data in Data Quality Health and Status

AMF data from the Point Reyes deployment are currently being displayed in DQ HandS. Metrics tables and diagnostic plots are updated hourly. This allows analysts to quickly assess the quality of data collected at AMF sites. The flags in Figure 1 alert an analyst of potential problems. Figure 2 shows SKYRAD plots available for the Richland, Washington (RLD), beta test deployment.

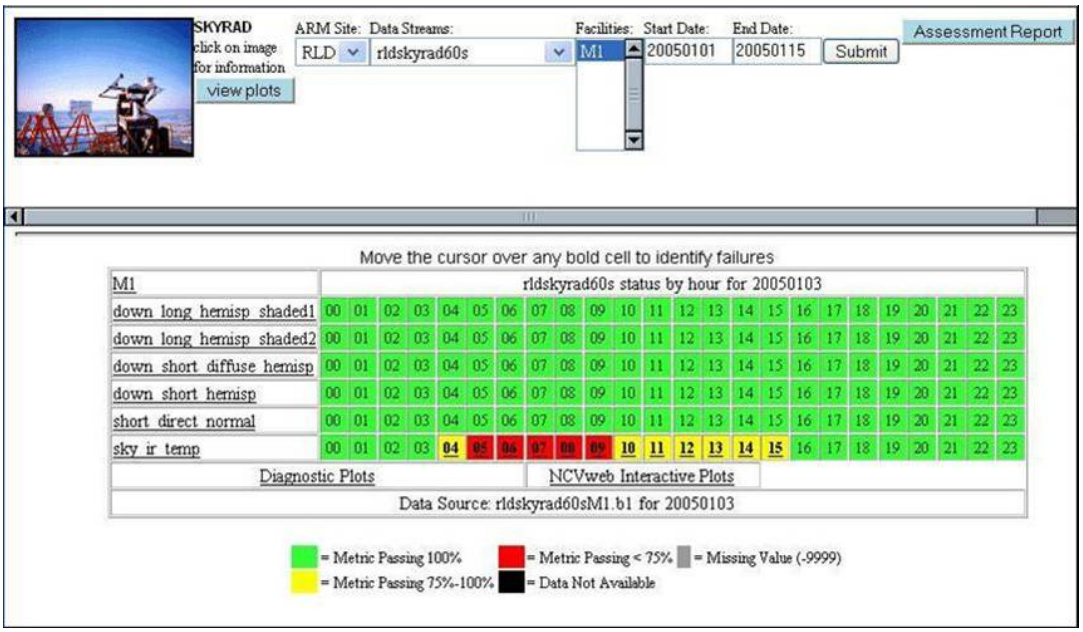

Figure 1. RLD skyrad60s on January 3, 2005.

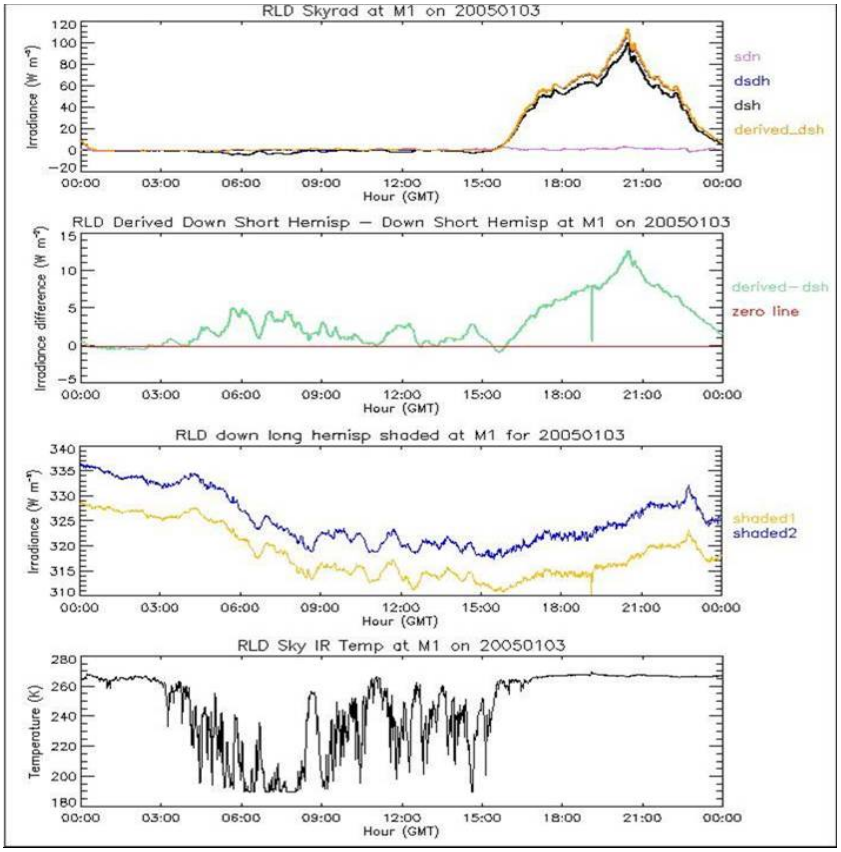

Figure 2. Skyrad60s plots for RLD.

Data Quality Plot Browser

The new diagnostic plot browser (http://dq.arm.gov/plotbrowser/) developed by Mission Research Corporation (MRC) has greatly enhanced data quality assessment for DQO analysts and mentors. A link from the main DQ HandS page allows users quick access to plots for a specified site, instrument, and time period. Figure 3 shows the front page of the browser and Figure 4 displays the result of selecting RLD skyrad60s from January 3 to January 15, 2005.

Figure 3. DQ HandS plot browser.

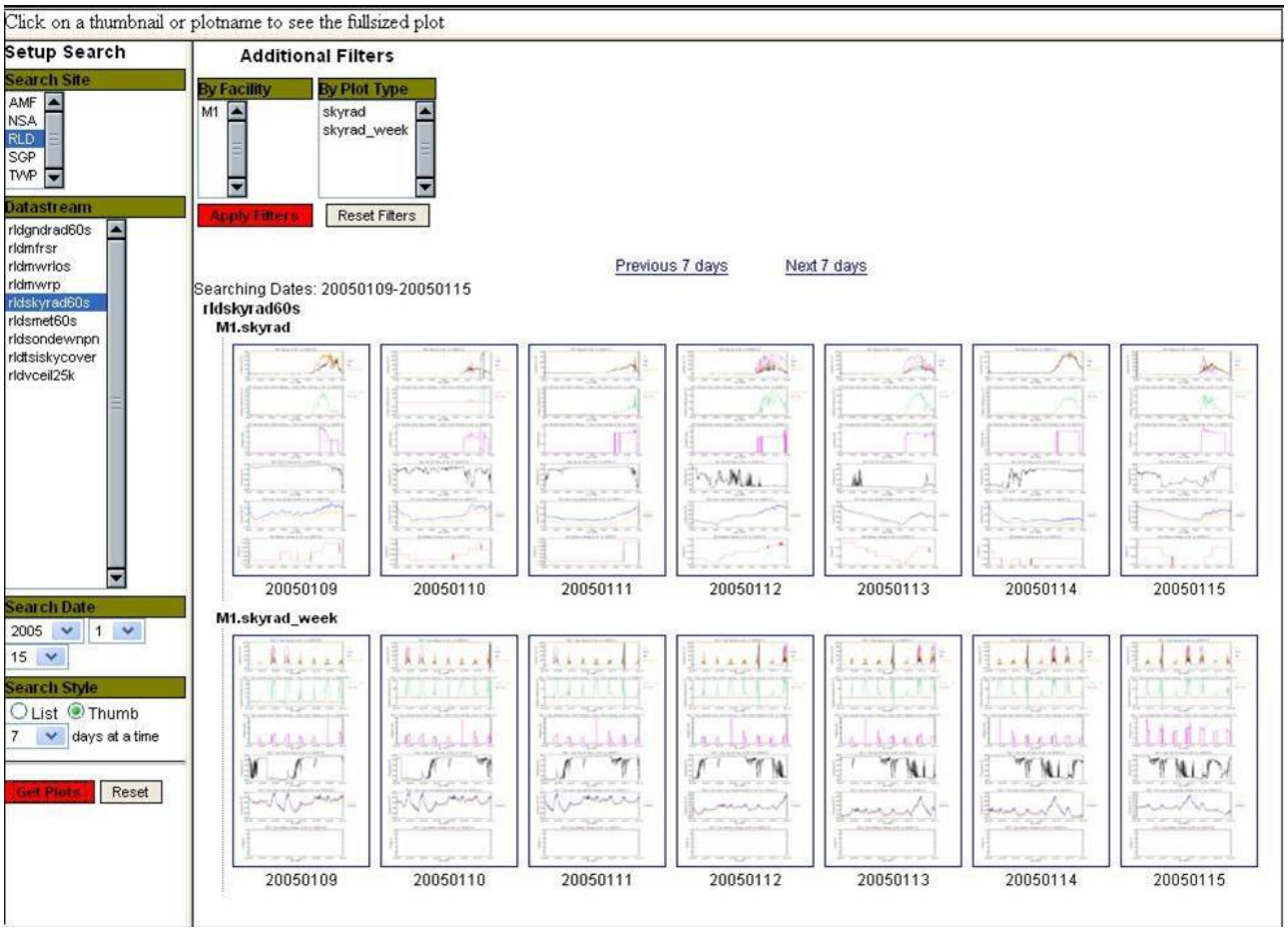

Figure 4. Thumbnail plots available.

New Data Quality Database

Data Quality Assessments (DQA) are now being stored in a database that allows analysts to recall previously entered assessments and see related Data Quality Problem Reports, problem identification forms, and baseline change requests. Figure 5 shows the web entry linked form DQ HandS where analysts make weekly assessments. This tool allows easier searching of all relevant ARM reports, including Engineering Change Requests (ECRs) and Engineering Work Orders (EWOs); Figure 6 shows the search page of the DQA database.

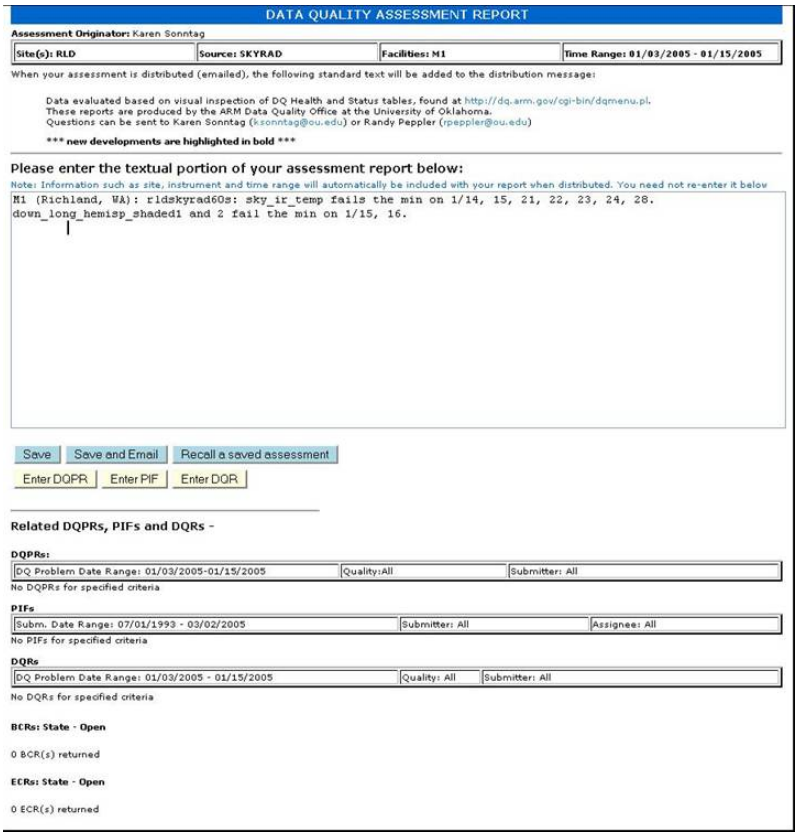

Figure 5. DQA web entry form.

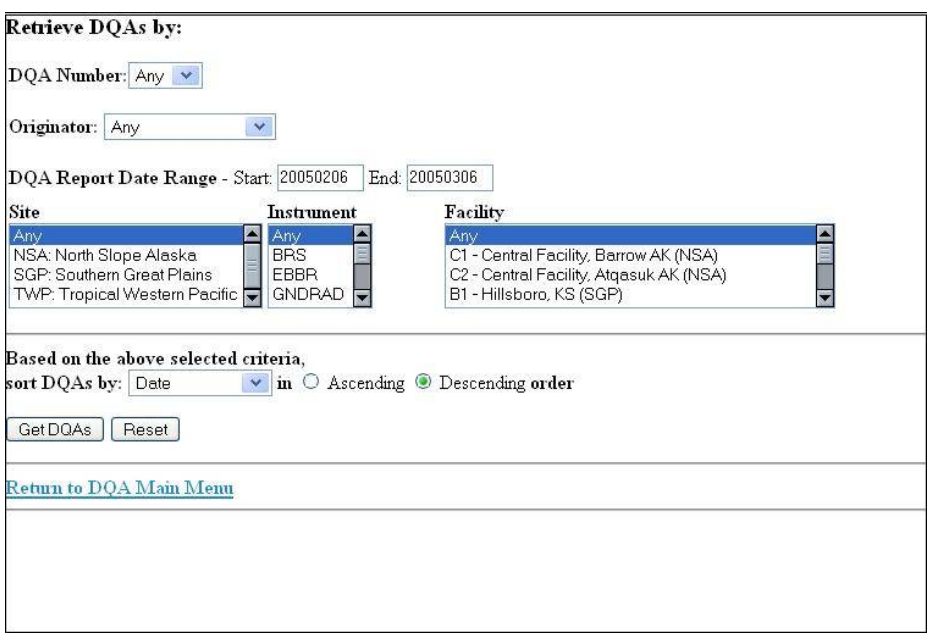

Figure 6. DQA database search page.

Daily Automated Statistics

To alert DQO staff of immediate problems, we created an automated notification of instrument performance. A "nuisance flag" filtered summary of failing flags, per hour, is emailed to key DQO staff. This allows us to investigate a problem quickly, reducing the amount time used in collecting potentially incorrect data. Figure 7 shows such a report for Southern Great Plains (SGP).

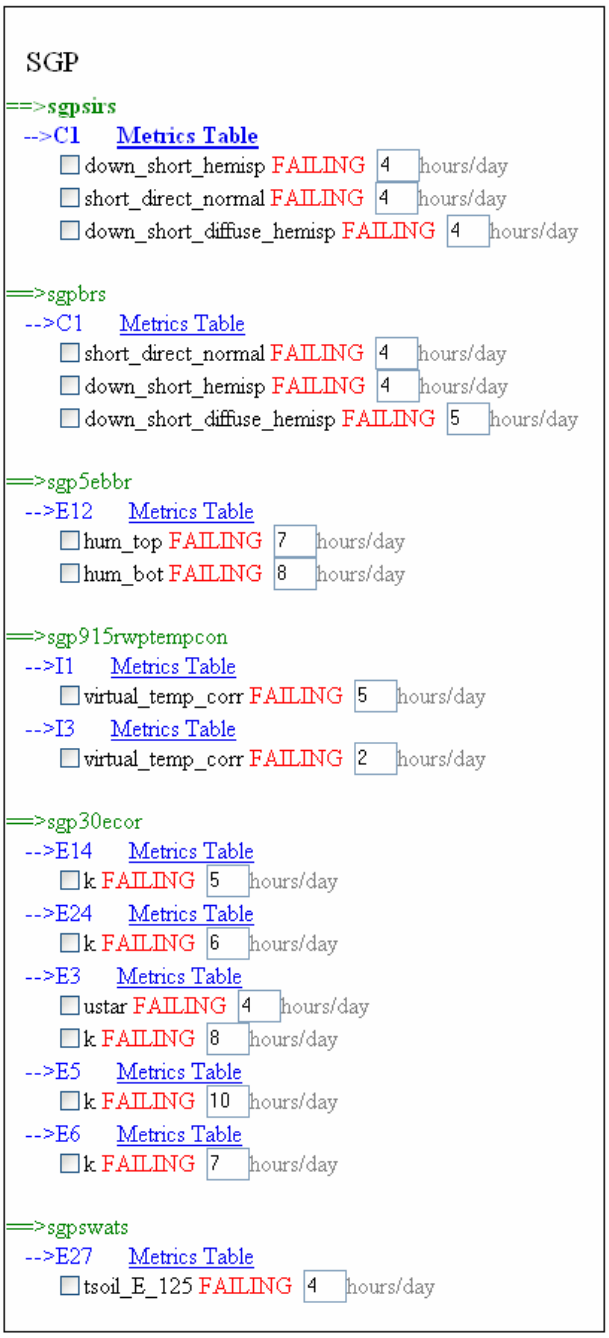

Figure 7. Automated stats report.

Work in Progress

In addition to developing tools to assist the analysts in assessing data quality, we are also working on ways to study trends in instrument performance by analyzing historical data (see Moore and Hughes extended abstract in this proceeding). Future plans to expand operations to monitor value-added products and Quality Measurement Programs are in discussion. We are also looking into using value-added products and Quality Measurement Programs as a tool to detect problems with instrument-level datastreams that would otherwise go undetected.

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