

# SGP Site Scientist Team and ARM Data Quality Office SGP Data Quality Assessment Activities: A New Approach

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## Introduction

A primary task of the Site Scientist Team (SST) of the Southern Great Plains (SGP) Cloud and Radiation Testbed (CART) site is to analyze and assess the quality of various SGP data streams. The opening of the Atmospheric Radiation Measurement (ARM) Program Data Quality Office (DQO) allowed for a cooperative effort between the SGP SST, Instrument Mentors (IM), and DQO. This approach led to the development of new tools for assessing data quality, reporting problems, and issuing data quality reports (DQR). This new approach is outlined below.

## SGP Data Quality Assessment Tools

**Performance Metrics.** In an effort to develop a systematic, integrated view of the quality of the SGP data streams over the long term, the SST in February 1996 began routine monitoring of SGP instruments through the creation and analysis of data quality (DQ) performance metrics. These metrics determine the percentage of data values, which fall within specified (by IM, factory recommendations, SST, etc.) quality tolerances (i.e., MIN, MAX, DELTA, or other).

**Data Quality Graphical Displays.** Data quality graphical displays are intended to provide a tool for conducting “first line of defense” quality control. These graphical displays aid in identifying problems with instrument performance by graphing key geophysical parameters and other pertinent information. The combination of performance metrics and data quality graphical displays provides enhanced DQ assessment.

The need to effectively view these DQ assessment tools convinced the SGP SST to create the new SGP Instrument Health and Status Website (discussed later).

## SGP Data Quality Reporting

**Data Quality Assessment Reports.** The first step in documenting SGP data quality is the Data Quality Assessment Report (DQAR). DQARs are weekly reports on SGP instrument data streams being analyzed by the ARM DQO or the SGP SST. The content of the DQARs is a weekly summary of the

findings, both positive and negative, obtained from analysis of the performance metrics and DQ graphical displays. Each DQAR has a specific distribution list including Site Operations, SST, DQO, Instrument Team Leader, and IM.

**Data Quality Problem Reports.** The next step in documenting DQ is to report any instrument-related problems to Site Operations. This is accomplished through the Data Quality Problem Report (DQPR) database developed by the SST and SGP Site Operations. The DQPR database, located on the Operations Management Information System (OMIS) website, was developed for the IM, SST, and DQO. The DQPR is used to alert Site Operations of any instrument-related problems and track corrective maintenance actions. Once a DQPR has been issued, Site Operations will schedule corrective maintenance, based on their documentation or IM suggestions. If the corrective maintenance action provided by Site Operations fails to correct the problem, it is up to the DQPR originator to provide further instruction. If the action solves the problem, the DQPR is closed and a DQR (see below) is written. The result is a well-documented interaction between the DQPR originator and Site Operations to effectively resolve the problem.

**Data Quality Reports.** The final step in documenting DQ is the DQR. DQRs are written statements provided by the IM, SST, or DQO about the quality of data for a specific time period. DQRs are extremely important because they provide the data user some baseline DQ information. In addition, DQRs are being used to color the quality of data via the Meta Data Navigator.

**Instrument Health and Status Website (<http://rl.sgp.arm.gov/~sgpdq>).** Figure 1 is a screen shot of the front page to the new **ARM SGP CART Site Instrument Health and Status Website**. There are two ways to view data quality from this website:

1. Health and status information for all locations of an instrument.
2. Health and status information for all instruments at a given site.

By selecting **Instrument** followed by **SIRS** on the website, you reach the web page illustrated in Figure 2. This page represents the current SIRS Health and Status. Each color-coded cell represents the hourly status of the given variable. For each hour, green denotes no quality control (QC) failures, yellow denotes failure rate from 1 to 25 percent, red denotes failure rate > 25 percent, and black denotes no data for that hour. Currently, the QC checks are MIN, MAX, and DELTA but could consist of any combination of checks.

These tables are updated hourly and a 30-day archive exists on the Website. For more information during use, a QC information link is provided on each page.

Current day Health and Status Tables do not have the mentioned Data Quality Graphical Displays. These are available for the archived days. Selecting **03/04/2001** from Figure 2, gives you Figure 3 and selecting **E3 DQ Plots**, gives you Figure 4.

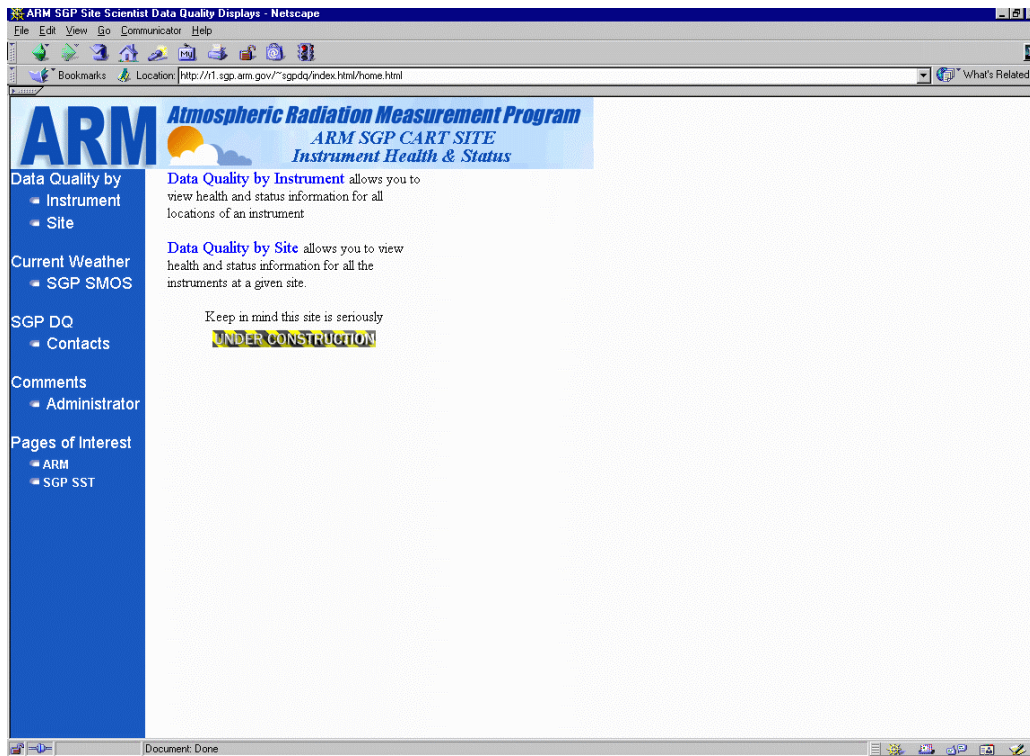


Figure 1. Screen Shot of the Front Page to the New SGP Instrument Health and Status Web Page.

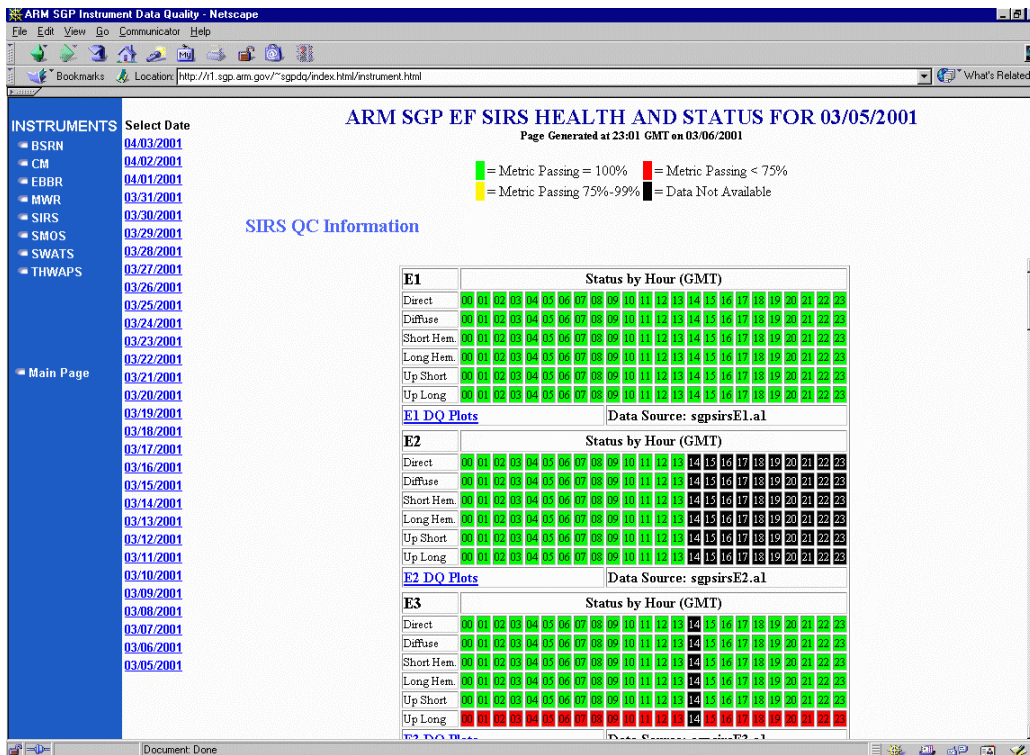


Figure 2. Screen Shot of the SIRS Current Day (20010305) Health and Status Web Page.