



Quality Issues in Multi-sensor Aerosol Level 3 Satellite Data

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With the recent attention to climate change and proliferation of remote-sensing data utilization, the climate models and various environmental monitoring and protection applications have been increasingly relying on satellite measurements. However, the user communities generally prefer not to deal with the complexities and peculiarities of Level 2 (swath) data. Instead, these users seek good quality gridded contiguous (no gaps) satellite data (Level 3), with uncertainties and biases provided for each grid cell. There are various issues in quality and uncertainty associated with Level 3 satellite data, for which other communities (e.g., sea-surface temperature, land, precipitation) have developed specific solutions. The aerosol community will benefit from addressing these issues and leveraging the best practices from other communities.

This talk addressed needs and issues of the aerosol community to systematically characterize, capture, and provision quality and uncertainties in Level 3 satellite data. In particular, we note the semantic differences in quality/bias/uncertainty at the pixel, granule, product, and record levels. We outline various factors contributing to uncertainty or error budget; errors introduced by Level 2 to Level 3 and Level 3 to Level 4 processing steps, including gridding, aggregation, merging and analysis algorithm errors (e.g., representation, bias correction, and gap interpolation). We also question methods for propagating (1) validation results from just a few points to global data uncertainty and (2) calibration and algorithm uncertainties to Level 3 gridded data. We attempt to solicit requirements for quality vs. coverage for the needs of different communities, e.g., what are the requirements for the aerosol data quality or what accuracy is needed for geolocating validation data, etc.