Experiences Developing a Semantic Representation of Product Quality, Bias, and Uncertainty for a Satellite Data Product

Patrick West (1), Gregory Leptoukh (2), Stephan Zednik (1), Chris Lynnes (2), Suraiya Ahmad (3), Jianfu Pan (4), and Peter Fox (1)

(1) Tetherless World Constellation, Rensselaer Polytechnic Inst., Troy, NY, United States, (2) NASA Goddard Space Flight Center, Greenbelt, MD, United States, (3) NASA Goddard Space Flight Center/Innovim, Greenbelt, MD., United States, (4) NASA Goddard Space Flight Center/Adnet Systems, Inc., Landham, MD, United States

With the recent attention to climate change and proliferation of remote-sensing data utilization, climate model and various environmental monitoring and protection applications have begun to increasingly rely on satellite measurements. Research application users seek good quality satellite data, with uncertainties and biases provided for each data point. However, remote-sensing quality issues are addressed rather inconsistently and differently by different communities.

This talk describes our attempt to systematically characterize, capture, and provision quality and uncertainty information as it applies to the NASA MODIS Aerosol Optical Depth data product. 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 attempt to assess needs for quality in different communities, e.g., to understand fitness-for-purpose quality or value of data vs. quality as provided by data providers.