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Ensuring Scientific Reproducibility within the Earth Observation Community: Standardized Algorithm Documentation for Improved Scientific Data Understanding

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Algorithm Theoretical Basis Documents (ATBDs) accompany Earth observation data generated from algorithms. ATBDs describe the physical theory, mathematical procedures and assumptions made for the algorithms that convert radiances received by remote sensing instruments into geophysical quantities. While ATBDs are critical to scientific reproducibility and data reuse, there have been technical, social and informational issues surrounding the creation and maintenance of these key documents. A standard ATBD structure has been lacking, resulting in inconsistent documents of varying levels of detail. Due to the lack of a minimum set of requirements, there has been very little formal guidance on the ATBD publication process. Additionally, ATBDs have typically been provided as static documents that are not machine readable, making search and discovery of the documents and the content within the documents difficult for users. To address the challenges surrounding ATBDs, NASA has prototyped the Algorithm Publication Tool (APT), a centralized cloud-based publication tool that standardizes the ATBD content model and streamlines the ATBD authoring process. This presentation will describe our approach in developing a common information model for ATBDs and our efforts to provide ATBDs as dynamic documents that are available for both human and machine utilization. We will also include our vision for APT within the broader NASA Earth science data system and how this tool may assist in standardizing and easing the ATBD creation and maintenance process.