GOES-18 ABI L2+ Cloud Cover Layers (CCL)
Full Data Quality
May 16, 2025
Read-Me for Data Users

GOES-R Advanced Baseline Imager (ABI) L2+ products will achieve Full Validation maturity by default after two years of Provisional and Operational use with no major anomalies reported (minor product improvements may still be occurring). As a result, GOES-18 Cloud Cover Layers (CCL) is considered Full Validation maturity as of May 16, 2025.

The ABI L2+ Cloud Cover Layers product is a derived cloud fraction at a predefined spatial resolution and between specified cloud layers. It also retrieves the total cloud fraction from surface to top of the atmosphere at the same resolution. It mainly utilizes cloud mask, cloud top and base products from upstream cloud mask, height and base algorithms to derive CCL information. CCL products include 6 cloud fractions: total fraction and 5 cloud layer fractions at predefined flight levels. The 5 layers are SFC-FL050, FL050-FL100, FL100-FL180, FL180-FL240, and FL240-TOA, where flight levels are in thousands of ft, e.g. FL050 is FL at 5,000 ft, SFC=surface, and TOA=top of atmosphere. The horizontal resolutions for those fractions are 10 km for Full Disk (FD) and CONUS, and 4 km for mesoscale (2 km native resolution products should be available in the future). The CCL products are generated for every FD, CONUS, and Meso sector.

A full description and format of the CCL product can be found in the Product Definition and User's Guide (PUG) Volume 5: Level 2+ Products, located on OSPO's GOES-R documents webpage: https://www.ospo.noaa.gov/Organization/Documents/goes-r.html. The algorithm used to derive the Cloud Cover Layers product from ABI observations is described in detail in the Algorithm Theoretical Basis Documents (ATBD): "AWG Cloud Cover Layer Algorithm". ATBDs are available at: https://www.star.nesdis.noaa.gov/goesr/documentation_ATBDs.php.

Full maturity, by definition, means that:

- Validation, quality assurance, and anomaly resolution activities are ongoing.
- Incremental product improvements may still be occurring.
- Users are engaged and user feedback is assessed.
- Product performance for all products is defined and documented over a wide range of representative conditions via ongoing ground-truth and validation efforts.
- Products are operationally optimized, as necessary, considering mission parameters of cost, schedule, and technical competence as compared to user expectations.
- All known product anomalies are documented and shared with the user community.
- Product is operational.

Persons desiring to use the GOES-18 ABI Full Validation Maturity CCL products for any reason, including but not limited to scientific and technical investigations, are encouraged to consult the NOAA/NESDIS/STAR Algorithm Working Group (AWG) scientists for feasibility of the planned

applications.

Known issues at the Full Maturity Validation stage include:

1. A horizontal striping artifact sometimes occurs in the CCL product. Since this artifact does not exist in any upstream input cloud products, nor in CCL products created locally at NOAA Cooperative Institutes or using the Satellite Algorithm Processing Framework, this issue is likely related to ancillary data used to create the CCL product in the operational processing system.
2. The nighttime CCL product sometimes shows fewer low/mid-level clouds compared to products from the Satellite Algorithm Processing Framework, likely due to differences in ancillary data to create the intermediate CBH product at night, which should come from NWP (GFS) data. Further investigation and potential scientific refinements are recommended for nighttime CCL/CBH products.

Contact for further information: OSPO User Services at SPSD.UserServices@noaa.gov

Contacts for specific information on the ABI L2+ CCL product:
Yoo-Jeong Noh yoo-jeong.noh@colostate.edu
John Haynes john.haynes@colostate.edu
Yue Li yue.li@ssec.wisc.edu
Mike Foster mike.foster@ssec.wisc.edu