Ver. 005-06-0032 Release Notes

(April 19, 2010)

1. Descriptions

- The version 0032 is a second test retrieval version to verify L1B and L2 data processing.
- We strongly request no scientific usage of version 0032 at present stage.
- The period of coverage of this version is from October 12, 2009 to March 17, 2010.
  - From November 30 to December 15, 2009, the ISS Solar Paddle stopped just in front of the SMILES IFOV due to the maintenance reason of the Port Solar Power Module elements of the ISS.
  - From February 25 to March 5, 2010, the number of L1B data is only around 10% of ordinary condition, due to trouble of communication system of ISS/JEM (not according to SMILES itself).
- There are two types of products. The one is consisted of minimum information (L2Product_G_RA, 0.8 MB/file), which is identical with the product of previous version. In addition of it, the other has detailed information, such as the status flag from L1B and averaging kernels (L2Product, 8MB/file). Refer to the Product Guide for details.
- The pointing direction for determining tangent altitudes (geometrical) is calculated by using SMILES scan mirror angle and ISS position. However, since the pointing accuracy heavily would affect to error of tangent altitude determination, an average altitude within single scan is retrieved with using the Star Sensor of SMILES in L2 processing. In case that sunlight or moonbeam enters in the FOV of SMILES Star Sensor, positioning information cannot be obtained, so it will be estimated from the information of 50 scans around the scan in such cases.
- The tangent altitude for L2 data is retrieved as an altitude offset.
- For the retrieval of Band C, a priori value of the tangent altitude is provided from Band A or B. (There are operational modes with Band A+C and Band B+C.)
- This version of L2 product includes some profiles which is inadequate for scientific use. In using these products, it is strongly recommended to pick up usable profiles according to the following conditions:
  - The converged profiles can be picked up with the condition of *NumIterPerform* > 0. The criteria is the most credible quality information, but only 40% of all products would meet this condition.
  - The nearly converged profiles can be picked up with the condition of

RadianceResidualRMS < 0.6. About 70% of all products would meet this condition.

- L2 product includes altitude range not usable for validation and/or science. If the *L2Precision* is more than 50% compared to the *AprioriError*, it is probable that L2 algorithm is just answering *a priori*. (*L2Precision* and *AprioriError* are defined as HDF EOS5 names in the SMILES L2 products.)

2. Improvements

- The scan data in the L2 product appears in order of observation time.
- Irregular values in "Longitude" and "SolarZenithAngle" field have been corrected.
- L2 processing has been carried out all for the L1B data. L2 product has about 1400 profiles / day.

3. Remaining Issues after ver. 0024

- In the forward model we notice a bug for the antenna pattern. In the current version of antenna pattern, consideration for 0.5-second antenna moving is not sufficient. It should be considered that the antenna is moving during the 0.5 second AOS integration.
- Hydrostatic assumption is broken for the version 0032. This will be corrected in future release.
- Results from Band A and B are not consistent in version 0032, such as O_3, HCl etc.
- HOCl, CH_3CN, HNO_3 and BrO data in band A look not usable.
- HNO_3 data in band C show +20% systematic errors.
- O_3 isotope products have not been checked yet.

4. Newly Found Issue in ver. 0032

- There seems to be some differences in the observed data between two spectrometers AU1 and AU2. The retrieval results based on the Band A observation might include discripancies depending on whether the observation was done with AU1 (in setting 3: Band A+B) or with AU2 (in setting 2: Band C+A).