Main processor improvements for Baseline 13

L1b Processor V7.11.2:

- A **new energy correction switch (correction on/off)** has been implemented for the processing of the Instrument spectral registration (ISR) mode for Rayleigh and Mie channel.
- **A new signal-to-noise-ratio (SNR) calculation is introduced for the Mie channel related to the total signal**. This new SNR is used for the new scene heterogeneity index in the L2A product introduced with Baseline 12.
- **Detection of saturated pixels has been added** to the imaging mode data processing of instrument defocus calibration (IDC), dark current calibration (DCC), and laser beam monitoring (LBM) as well as to the lidar mode data processing of dark current in memory zone (DCMZ).
- The **L1B_DCMZ calculation validity filtering for solar background is now based on sun elevation**.
- **Bug fixes** were performed in **digital elevation model (DEM) intersection recognition** (longer satellite to target travel time) and **Mie non-linearity correction**.

L2a Processor V3.13.6:

- **First preliminary version of the optimal estimation retrieval** (AEL-PRO) for extinction and backscatter is now implemented in the L2A processor. **The corresponding data products are available for testing, but flagged invalid.**
- **New algorithms for detection of missed hot pixels and correction of the input Mie measurement data** as well as a new algorithm to determine the effective Mie spectrometer response (EMSR) array (replacing the static tripod obscuration correction – TOBS – array) from the Mie measurement data has been **implemented as part of the Aeolus Feature Mask (AEL-FM) processor**. The EMSR array is also reported as new parameter in the L2A product.
- **A cloud screening based on total cloud backscatter extracted from auxiliary meteorological data** (i.e. cloud both liquid droplet and ice particles water content) **has been implemented in the Standard Correct Algorithm (SCA)**; new outputs are stored in product confidence dataset (PCD) dataset for bin and mid-bin.
- **Retrieval of data quality flags in the SCA data set has been improved**: checks on relative errors (alpha, mid_alpha, beta, mid_beta) have been replaced by checks on absolute errors.

L2b Processor V3.60:

- **A new parameterization to correct the Rayleigh Response was added**. This can **improve** the wind retrieval for **Rayleigh cloudy winds**. It is a simplified implementation of the earlier proposed 4th dimension to the Rayleigh Brillouin Calibration (RBC) table.
- **Ground detection has been extended to allow detecting if the surface is near** (but not intersecting with) the bottom of the range bin. **This can be used to account for DEM inaccuracies and for the range bin signal overlap** (cross-talk between bins) **which may result in wrong winds close to the surface**. In addition, a new check was added based on the digital elevation model (DEM) value provided in the AUX_MET_12 file.
- The **inconsistency between grouping settings and the reported accumulation length result has been solved**.
- The **AUX_TEL_12 file format has been changed**. A field was added to **record the fit validity for both channels independently**. This is needed to allow more data to be included in future reprocessing campaigns. In addition, **quality indicators have been added for both channels** that can be used for monitoring the AUX_TEL_12 production process.