Main processor improvements for Baseline 11

L1b Processor V7.09.1:

- **Sat-LOS velocity correction implemented in order to compensate for an on-board software bug.** A switch in the AUX_PAR_1A allows to deactivate the correction thus E2S simulated data can still be processed properly.
- **Gyro angles** for gyros 1 to 4 **have been added to the L1A products of all instrument modes.**
- **Sun elevation angles have been added to all L1A products of all instrument modes and the L1B wind mode product.**
- Several flags have been added to the AUX_PAR_1B for selection of ACCD pixels that should be used for DCO correction. This allows a differentiated analysis of the DCO correction.
- The L1B processor now derives DCMZ correction values for the solar background in DCMZ mode. These new values are used for DCMZ correction of the background row in wind mode data before the background itself is used for correction of atmospheric height bins.
- A mitigation approach has been implemented for calculation of refined SR and SNR Mie values. Especially for strong Mie signal the MieCore algorithm retrieves negative offset values and this causes missing refined SR and SNR Mie values; a default value of 1.0 for the offset is used for refined SR and SNR Mie value calculation.
- **Rayleigh spot location and width values have been added to L1B wind products for the reference pulses and all atmospheric height bins.**

L2a Processor V3.11:

- **A new radiometric correction using M1 mirror temperatures has been implemented in the L2A processor.** This correction drastically reduces the along orbit variations of the bias.
- **A new user-friendly Python script for reading/plotting the L2A products is provided.**

L2b Processor V3.40.2:

- **Undo wind bias correction in BUFR files using the L2B_ee2bufr tool provided in the new L2B processor.** A user has to do his own EE to BUFR conversion to be able to use this option. Note that the L2B file format did not change between release V3.30 and V3.40, so the tool can handle both the current NRT data and the reprocessed 2019 data. For V3.50 a file format change is foreseen for the L2B product and a new version of this conversion tool will be provided to handle this.
- **Now different SNR thresholds for classification of Mie and Rayleigh, and an option to transfer Mie SNR results to the Rayleigh channel was added.** This allows to do SNR based classification for the Rayleigh channel which results in a clear quality improvement (since SR on Meas. Level has much more noise than SNR on Meas. level).
- **New option to flag winds invalid via the AUX_PAR_2B parameter file.** This will be used to communicate periods of degraded quality in L2B winds to NWP users and allows them to automatically reject this data without having to implement manual rejection lists. If needed the degraded quality can be communicated separately for the Mie and Rayleigh channel.
- **Update of Python AUX_TEL generator**:
  - **Fitting will be performed based on only Rayleigh clear and Mie cloudy winds.** In the previous version, the fitting was based on both observation types (clear and cloudy)

which left a small remaining bias when comparing M1 corrected Rayleigh clear winds or Mie cloudy winds with the model.
- AUX_TEL_12 EEF file format change: Configuration parameters of the Python AUX_TEL generator are now stored in the specific product header of the file.