Will re-reduction improve the Cycle 0 data products provided by the archive?

Mark Lacy - 2023-11-01 - Historical Articles

Cycle 0 data was processed by ALMA science staff using CASA, with scripts that reflect the best practices in ALMA data reduction. However, improvements and bug fixes to CASA are made over time, and users may wish to reprocess their data with a more recent version of CASA in order to produce the best possible result.

Cycle 0 data was reduced with CASA versions 3.3, 3.4 and 4.0. In order to determine which version of CASA was used for your reduction, see the Knowledgebase article How can I tell from the scripts provided as part of the Cycle 0 data products which version of CASA was used? Among the more significant changes between 3.3, 3.4 and subsequent versions of CASA that affect the data (typically only at the few percent level or less) are the following:

1. The primary beam models were updated in CASA 3.4 (see article Are there particular advantages to using CASA 3.4 or later for ALMA Cycle 0 data?)
2. There was a bug in shadow flagging in CASA 3.4 (and 4.0.0, but not in 3.3) which resulted in the shadowing antenna being flagged, not the shadowed one.
3. The solar system object models were updated in CASA 4.0 to the Butler-JPL-Horizons 2012 models, resulting in more accurate flux calibration (see article How can I update Cycle 0 absolute fluxes to the Butler-JPL/Horizons 2012 model standards?)
4. There was a bug in the clean task in CASA 3.4, 4.0 and 4.1 which affects the flux scaling and restoring beam calculations when selecting field by name and the field name ends in a minus (see article Why are flux scaling and restoring beam calculations in CASA task clean incorrect when selecting field by name and field name ends in a minus?)