ALMA Science

I heard that images generated with CASA<5.1.1 are affected by CASA imaging issues. How should I deal with it?

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Mosaic images of the 7-m array generated with CASA versions <5.1.1 (for the product images, these CASA versions were used in Cycles 1-4) and mosaic images of the both 12-m and 7-m array generated with CASA version 5.1.1 to 5.3 (for the product images, these CASA versions were used in Cycles 5) are affected by CASA imaging issues. Some of them introduce non-negligible error in the flux density distribution. Please check the following for detail,

1.   Mosaic images of the 7-m array generated with CASA versions <5.1.1 (for the product images, these CASA versions were used in Cycles 1-4) were all affected. The impact of this error is the fluxes are overestimated by ~10% throughout the map. This specific issue was resolved in CASA version 5.1.1 and beyond.

2.   A different and more complex imaging issue arose in the CASA version 5.1.1 to 5.3, which affects all product (mosaic) images in Cycle 5. While there are a variety of factors that contribute to the range of impacts, the most important parameter is the aspect ratio of the mosaic pointing distribution, i.e., the width/length ratio of the pointing centers (not the image size). For projects with aspect ratios <1.5, the impact on fluxes throughout the bulk of the map is small, with large deviations in flux (>5%) largely confined to the edges of the map where the mosaic .pb file reaches values of <0.5. If your science does not depend sensitively on fluxes measured at the edges of the mosaic and your aspect ratio is <1.5 the impact is negligible. If your aspect ratio is ≥1.5, fluxes in the bulk of the map can be affected. This issue has been resolved in the Cycle 6 Pipeline (CASA version 5.4.0 or beyond).

The re-imaging process by the Observatory has been on-going. The product images contained in the currently downloadable datasets are free from this issue. The remaining datasets which include images that have not been re-imaged yet are set to QA3 status and users cannot download them for now. Users can always check the CASA version used in the imaging in the README or QA2 report for the datasets downloaded in the past. Users can also check the CASA version in the FITS header for the images.

Users can fix these issues by re-imaging with CASA >=5.4 where the issue has been fixed. Note that CASA imaging issues affect only images and DO NOT affect the visibility calibration part. If user starts the re-imaging from the raw data, please reproduce the calibrated data using the same CASA version as used for QA2 that is specified in the README or QA2 report. If user has the calibrated ms data they can use the re-imaging as is.

You can find additional documentation on Science Portal

https://almascience.nao.ac.jp/news/public-announcement-of-casa-imaging-issues-affecting-some-alma-products

If you have any questions about these issues and the steps taken by the Observatory, please contact your local ARC for support through the ALMA Helpdesk at https://help.almascience.org.