

V131b Correction of Atmospheric Effects in ALMA Single-Dish Pipeline

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We report recent improvement of ALMA Single-dish Pipeline regarding the correction of atmospheric effects. Single-dish spectral data has been corrected for atmospheric effects by subtracting the reference data from the source data where the reference data is taken at the reference position which is emission-free region close to the source. In practice, however, the reference can be far from the source for ALMA especially in the observation of Galactic sources. If elevations of reference and source are significantly different, resulting corrected spectra may show artificial emission or absorption features, which make subsequent data processing extremely difficult.

Recently, Sawada et al. (2021) established a way to correct atmospheric effects in the offline data processing phase. They showed that artificial features originated from the incorrect reference are considerably suppressed by performing the additional correction based on the estimation of residual component using atmospheric model. The algorithm has been implemented in CASA as a new task, `sdatmcor`. We succeeded in reducing the noise level of final image cube by incorporating the new task into ALMA Single-dish Pipeline for Cycle 8. Currently, we are developing the heuristics to optimize the atmospheric model for correction. The heuristics is expected to be available in Cycle 9 Pipeline. In this talk, we describe the algorithm of offline correction and the heuristics for optimization as well as the technical aspects of the development.