[JJ] Evening Poster | P (Space and Planetary Sciences) | P-CG Complex & General

[P-CG22]New Developments of Planetary Sciences with ALMA

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The Atacama Large Millimeter/Submillimeter Array (ALMA) starated its science operation in 2011, and long-baseline observations have become available since 2014. ALMA, with its high sensitivity and resolution, has provided us with qualitatively new information on star and planet formation and small bodies in our Solar System. For example, the discovery of narrow gap structures in the protoplanetary disks around young stars HL Tan and TW Hya enabled us to actually compare the long-standing theoretical models of planet formation with real observations. In our solar system, 60km pixel-scale non-uniform brightness distribution and the rotation of the asteroid Juno are detected. Spatially-resolved thermal mapping of Europa icy surface enables us to search for thermal anomaly in possible plume source regions. As of Cycle 4, Solar observations are available, enabling us, for example, to determine the physical parameters of plasmoid quantitatively. In this session, we overview the latest results of ALMA observations in the field of planetary sciences. We also accept any theoretical and experimental works that are closely related to the observations and discuss the impact on the planetary science community.

[PCG22-P03]Current status of data analysis of Venusian middle atmosphere observed by ALMA/ Synergy mission with Venus climate orbiter "Akatsuki"

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For understanding of the origin of the short-term changes (several days/months) of CO mixing ratio in the Venusian middle atmosphere observed by the ground based millimeter wave band 10 m Telescope, SPART, it is essential to research the link between the atmospheric chemistry and dynamics in Venus. For this purpose we carried out the synergetic observations with Atacama Large Millimeter/submillimeter Array (ALMA) and Venus climate orbiter, Akatsuki.

In November and December 2016 and May 2017, we carried out the target of opportunity observations of CO and ^{13}CO at 200 GHz band (Band 6) and CO, ^{13}CO, HDO, SO, and SO_2 at 300 GHz band (Band 7) with ALMA synchronizing the fifty 12 m antenna arrays and Atacama compact arrays (twelve 7 m antenna arrays and four 12 m single dish antennas) to fulfill the coverage of UV plane. The spatial resolutions for the Band 7 and Band 6 under the C40-4 antenna configuration are 0.43 and 0.63 arcsec, respectively. The Voigt line shapes of the spectral lines obtained by ALMA give us the 3D information (longitudinal, latitudinal, and vertical distributions) of the minor constituents and the wind velocity of the Venusian middle atmosphere. On the other hand, by using the infrared and ultra-violet band cameras of Akatsuki the dynamics and chemistry in the H_2SO_4 cloud region and troposphere can be traced. At present, the ALMA data is being processed by the semi-interactive analysis for the quality assurance procedures

(QA2) in Joint ALMA observatory and East Asian ALMA Regional Center, and some data observed by 12 m and 7 m array were already delivered. By performing the band-pass correction and clean process of the delivered data set, we could obtain the 3D maps of ^{12}CO, ^{13}CO and SO and the maps of wind velocity, successfully. The maps show their day and night inhomogeneous distributions. For further reliable analysis, we will have to wait for the delivery of the TP array data set which allows us to calibrate the spectrum and to validate the missing flux effects. In this conference we will present the current status of the above analysis of the ALMA’s data.