[EE] Evening Poster | P (Space and Planetary Sciences) | P-PS Planetary Sciences

[P-PS02]Regolith Science

convener:Koji Wada(Planetary Exploration Research Center, Chiba Institute of Technology), Akiko Nakamura(Graduate School of Science, Kobe University), Patrick Michel(共同), Kevin John Walsh (Southwest Research Institute Boulder)
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Recent planetary explorations have revealed that almost all solid bodies in the solar system are covered with small particles, called regolith. The surface geology, especially regolith behavior on the surfaces of solid bodies, becomes increasingly more important as represented by Hayabusa mission and other on-going and planned sample-return missions such as Hayabusa2 going to an asteroid Ryugu, OSIRIS-REx going to an asteroid Bennu and MMX planning to go to the martian satellites.

For fully understanding the regolith science, it is required to know and compare the regolith conditions on various celestial bodies, from asteroids to planets, with various methods.

Therefore, this session welcomes broad topics related to regolith on various celestial bodies, such as asteroids, comets, the Moon, the martian moons, Mars, etc. Papers on the formation, evolution, and alteration processes of regolith particles and regolith systems on the surface of planetary bodies, remote and in-situ observational results and techniques, analyses and results of returned samples, and laboratory, numerical, and theoretical studies on the fundamental physical and chemical processes are all welcome.

[PPS02-P02]Bed depth detection from impact penetrometry

*Kevin John Walsh[1], Alex Harrison Parker[1] (1.Southwest Research Institute Boulder)
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Many current spacecraft and landers, by their very nature, perform low-velocity penetrometry experiments on the surfaces of small bodies. Spacecraft instrumentation observe the spacecraft-asteroid interactions and will allow the determination of some surface properties of the asteroids by analyzing imaging and spectra - but also spacecraft telemetry. For future missions directed penetrometry experiments could provide critical information to the sample-site selection processes prior to the interaction with the surface by the main spacecraft.

Here we explore the dynamics of low-velocity penetrometry that allows for the determination of a regolith bed depth and discuss its applications to exploring the subsurface of an asteroid. Combined laboratory experiments, numerical modeling and common universal force laws provide a framework to interpret acceleration profiles of impactors hitting granular materials at low-velocities with minimal prior knowledge of the local material properties.