



Chinese Balloon-borne Optical Remote Sensing Program for Planetary Sciences

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Deep space exploration is one of the Chinese scientific strategies in the future. As two examples, China has successfully implemented the Chang'E Project and approved the Mars in-situ detection program. Orbiter exploration programs to Jupiter are being discussed in Chinese communities. Moreover, Earth-based planetary optical remote sensing, such as balloon-borne telescopes and ground-based telescopes, could also provide unique value in resolving planetary environments. Compared with space-based missions, the advantages of these telescopes include low costs, maintainability, long-term continuous observation, and rapid response to space events. As supported by the Strategic Priority Research Program of Chinese Academy of Sciences, that is the Scientific Experimental system in Near-Space (SENSE), the Institute of Geology and Geophysics, CAS (IGGCAS) is leading a project to carry out coordinated balloon-borne planetary optical remote sensing and ground-based monitoring of planetary geological activity. In this program, a balloon-borne planetary atmospheric spectral telescope (PAST) with 0.8-m aperture in spectral range from 280 nm to 680 nm will be floated at 35-40 km altitude to observe and investigate the global space environment of Mercury, Venus, Mars, and Jupiter. At the same time, two ground-based telescopes both with 1-m aperture will be established to monitor the geological activities of Jupiter's moons (e.g., the volcanic activity on Io). Using the coordinated observations by PAST and ground-based telescopes and other satellite measurements when available, we will investigate mass transport and energy dissipation in space environments for solar system planet.