

## Report for Onsite Training in Earth-Space Frontier Science

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|---------------------|-----------------------------------------------------------------------|---------------|--------------|
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After finishing a terrestrial analog study and a simulation study on the formation of martian carbonates, I applied my previous findings to actual data from Mars in a remote-sensing project to study the relationship between primary rock composition and carbonate composition on Mars. The Compact Reconnaissance Imaging Spectrometer for Mars (CRISM) aboard the Mars Reconnaissance Orbiter, which covers visible to infrared wavelengths with high spectral and spatial resolutions, has been the mainstay for mineralogical studies of the surface of Mars. During my time at the Planetary Geology and Surface Simulation Lab, Institute for Planetary Materials, I learned the entire workflow of CRISM imagery analysis from Prof. Trishit Ruj, Dr. Ranjan Sarkar (through email correspondence and a remote meeting with the Max-Planck Institute for Solar System Research, Germany), and graduate students in the lab. Using software that I did not have access to in my lab, I was able to download and process CRISM images, map spectral summary parameters to search for specific minerals, extract spectra from regions of interest, enhance spectral features by ratioing with the mean spectrum, and analyze individual spectra in detail to confirm the identity of minerals. Since no locally associated carbonates and feldspar-rich rocks on Mars have been reported by previous remote-sensing studies, I applied these methods to images that contain previously mapped carbonates or feldspar-rich rocks but not both to search for carbonates associated with feldspar-rich rocks or vice versa. I obtained some preliminary results and will continue to perform detailed analyses in collaboration with Prof. Ruj and other members of the Planetary Geology and Surface Simulation Lab.



The Institute for Planetary Materials, Okayama University, in Misasa, Tottori, where I completed the onsite training.