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Mapping silica content of Altiplano-Puna Volcanic Complex using ASTER Global Emissivity Dataset

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The Altiplano-Puna volcanic complex (APVC) of the Central Andes is a unique region characterized by extensive silicic volcanic eruptions of the past ~10 million years and remains active today. Many volcanic features at the APVC are well preserved due to arid climate, making the study of surface volcanic features influential for better understanding this region. The arid climate also provides excellent observation conditions of the bare land surface from spaceborne remote sensing instruments. Given this condition, multispectral and hyperspectral remote sensing observations are well suited to efficiently characterize the mineralogy and geology of this extensive province (ca. 70,000 km^2) and contribute to deeper understanding of the APVC. Previously, we have analyzed the mineralogy of the APVC using remote sensing data in the visible to near-infrared wavelengths (VNIR; 0.4-2.5 μm). This wavelength range is sensitive to iron-bearing and alteration minerals, and in our previous studies, we detected and mapped the distribution of ferric iron minerals and alunite/kaolinite minerals. For this study, we investigate the silica content of the APVC using the thermal infrared (TIR; 8-13 μm) emissivity data of the instrument Advanced Spaceborne Thermal Emission and Reflection Radiometer (ASTER) onboard NASA's Terra satellite. We derived silica content from ASTER emissivity spectra based on the correlation between the minimum of reststrahlen bands in the TIR and silica content of minerals. The map of silica content is a complementary information for analyzing the APVC along with data from VNIR observations and field campaigns. Synergistic combination of these remote sensing products advances our goals of 1) understanding the regional context of the samples collected from this area in previous field expeditions, 2) improving interpretations of similar datasets of Mars and the Moon, and 3) understanding the geology and mineralogy of APVC.