

APPLICATION OF SYNTHETIC APERTURE RADAR(SAR) FOR EXPLORATION OF MINERALIZED ZONES

Wooil M. Moon, D. J. Kim, C.W. Lee (Earth System Sciences, Seoul National University, Seoul 151-742, Korea), and S.W. Choi (Earth and Environmental Studies, Korea Univesity, Seoul, Korea)

The conventional remote sensing techniques have been a good tool for reconnaissance exploration / geological surveys. However, optical sensors depend on the solar illumination and have limited applications particularly in tropical and subtropical regions. Synthetic Aperture Radar (SAR) is an active sensor which has the all-weather imaging capabilities in addition to the multiple frequency and multiple polarization advantages over the conventional optical sensors. Although SAR alone cannot be used as a sole tool for any mineral exploration task, it can be an excellent auxiliary tool for many geological mapping and mineral exploration tasks. SAR can be particularly useful in a multi-sensor, and multiple layer exploration data situation, where a well tuned quantitative data fusion techniques can be applied. In this study we chose the SIR-C multiple frequency data sets over the Hwangangri mineralized zone where a number of W - Mo - F mineralization was previously reported. The number of data sets include surface geological map data, geochemical data and geophysical data, in addition to the SIR-C (NASA JPL) data. The data fusion steps includes pre-processing, information representation using fuzzy logic, and fusion test with several of fuzzy operators, prior to the final verification of the results with the SIR-C data. The composite L- band and C-band SIR-C data accurately outlined the mineralized alteration zones which was also clearly outlined in the fuzzy logic mineralized zones. In this study we have demonstrated that multiple frequency SAR data can be an excellent tool for alteration type mineralized zones among other applications.