

IAF SPACE EXPLORATION SYMPOSIUM (A3)
Mars Exploration – missions current and future (3A)

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DECIPHERING THE MARTIAN RECORD: UTILIZING IN-SITU CHARACTERIZATION AND
SOFTWARE MODELING FOR A COMPREHENSIVE MINERALOGICAL ANALYSIS**Abstract**

Mineralogy of the Mars is very important as it aids in analysing the past evolution to present research and future progressions. It helps in knowing the planet from the crust. Our research primarily focuses on Mars' mineralogy, examining surface minerals, their distribution, chemical formations, and crustal tectonic motions. By examining mineral kinds and their distribution, we hope to determine formation rates and environmental circumstances favourable to their genesis, thereby illuminating their chronology. Using data from missions such as Ingenuity rover, Mars Global Surveyor (MGS), Curiosity rover, Opportunity rover and Viking lander, we systematically extract the surface mineral data to create a complete timeline of Mars mineral production. Our research aims to provide a thorough picture of Martian regoliths using insights gained from in situ characterizations by Mars Exploration Rovers and landers. By linking mineralogical data to chemical evolution, we hope to discover dominating processes and probable alteration mechanisms, particularly those driven by water quantity and activity. This comprehensive technique allows us to estimate expansion rates and formation timeframes, revealing information on the complex history of Martian surface minerals through appropriate software models. This research will contribute to a deeper understanding of Mars' geological processes and offer insights into its past potential for supporting life.