THE METEORITIC COMPONENT ON THE SURFACE OF MARS: IMPLICATIONS FOR ORGANIC AND INORGANIC GEOCHEMISTRY. C. Kolb[1,2], R. Abart[2], E. Wappis[1], T. Penz[1], E. K. Jessberger[3], and H. Lammer[1], [1]Space Research Institute, Austrian Academy of Sciences, A-8042 Graz, Austria, christoph.kolb@oeaw.ac.at, [2]Institute for Mineralogy and Petrology, University of Graz, A-8010 Graz, Austria, [3]Institute for Planetology, University of Münster, D-48149 Münster, Germany.

Introduction: The mixing relationships, in particular the meteoritic contribution in the Martian soil were determined by means of least squares analysis of chemical data from APXS-*Mars-Pathfinder (MPF)* [1] and XRF-*Viking* [2] measurements. The soil composition may be represented as a mixture of the *MPF*-soil free rock (SFR), primitive cosmic material (CI-chondrite), and physical weathering products of *MPF*-andesites (PWP). Based on the component analysis, the composition of the Global Dust Unit and constraints on trace element concentrations as well as the amount of putative organic matter are inferred.

Method and results: In our least squares (LS) analysis 13 major elements were taken into account. The SFR and CI-chondrite compositions were taken from [1] and [3], respectively. Prior to LS analysis a CIPW normative calculation was done on the SFR chemistry. In analogy to Antarctic weathering scenarios, minerals with high susceptibility to physical disintegration were assigned to a fraction of detritus PWP according to their normative ratios in parent andesites. To account for the uncertainties inherent in analytical data from Mars, the individual element concentrations were weighted accordingly. The convergence of the regression lines to a single point indicate the existence and the composition of a Global Dust Unit (GDU). GDU material appears to be intimately admixed to *MPF* surface soils (~40wght% CI) and also to *Viking* deep soil samples (~25wght% CI). This is consistent with data in [4] and [5]. Some GDU material also appears to adhere to *MPF* rock samples.

Implications: Our analysis allows to estimate soil formation rates and trace element as well as organic matter abundances on Mars. According to the inferred meteoritic contribution, 1.4 wght% C is missing in the Martian soil. Similarly, 0.4 wght% Ni should be present in surface soils. This is more than APXS data would suggest. The discrepancy in Ni concentrations might be due to secondary fluorescence effects. Alternative *in-situ* analytical techniques, such as Laser-induced Plasma Spectroscopy (LIPS), may help to resolve this problem.

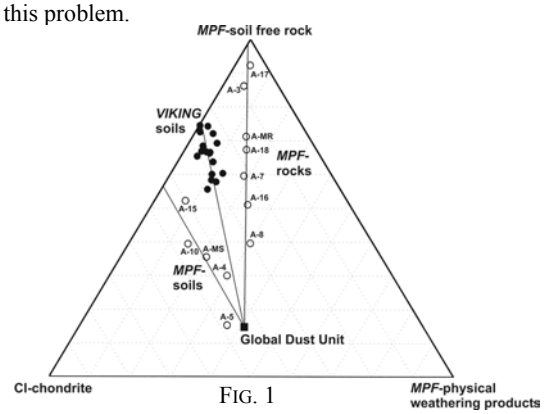

FIG. 1

References: [1] Wänke H. et al. (2001) *Space Sci. Rev., 96*, 317-330. [2] Clark B. C. et al. (1982) *JGR, 87*, 10,059-10,067. [3] Wasson J. T. and Kallemeyn G. W. (1988) *Phil. Trans. Roy. Soc*., *A325*, 535-544. [4] Boslough M. B. (1988) *LPS XIX,* 120-121. [5] Flynn G. J. and McKay D. S. (1990) *JGR, 95,* 14,497-14,509.