THE JEZERO CRATER FLOOR SAMPLE SUITE COLLECTED BY THE MARS 2020 PERSEVERANCE ROVER. Barbara A. Cohen[1], Kathleen C. Benison[2], Tanja Bosak[3], Andrew D. Czaja[4], Vinciane Debaille[5], Elisabeth M. Hausrath[6], Christopher D.K. Herd[7], Keyron Hickman-Lewis[8], Lisa E. Mayhew[9], Mark A. Sephton[10], David L. Shuster[11], Sandra Siljeström[12], Justin I. Simon[13], Benjamin P. Weiss[3], María-Paz Zorzano[14], Meenakshi Wadhwa[15], Kevin P. Hand[16], Vivian Z. Sun[16], Kathryn M. Stack[16], Kenneth A. Farley[17]. [1]NASA Goddard Space Flight Center, Greenbelt MD (Barbara.A.Cohen@nasa.gov); [2]West Virginia Univ; [3]MIT; [4]Univ Cincinnati; [5]Univ Libre de Bruxelles, Belgium; [6]Univ Nevada, Las Vegas; [7]Univ Alberta, Canada; [8]Natural History Museum, UK; [9]UC Boulder; [10]Imperial College London, UK; [11]UC Berkeley; [12]RISE, Sweden; [13]NASA JSC; [14]CAB, Spain; [15]ASU; [16]JPL; [17]CalTech.

Introduction: The Mars 2020 mission is to investigate regional geology, evaluate past habitability, seek signs of ancient life, and assemble a returnable cache of samples as the Perseverance rover explores Jezero Crater, a Noachian crater on the edge of the Isidis basin that contains a deltaic system. The Perseverance rover recently completed a traverse of the floor of Jezero crater, characterizing and collecting samples from two units informally named the *Máaz* and *Séítah* formations (Cf-Fr and Cf-F1 in [1]). The *Máaz* fm makes up the current Jezero Floor surface, appearing to overlie the *Séítah* strata. Eight rock samples were collected and stored in the rover, along with proximity science observations using the rover's onboard payload about the composition, mineralogy, and texture of the sampled rocks.

Seitah samples: The *Séítah* fm outcrops across the crater floor to the southeast of the delta. Orbital data suggested that *Séítah* contains olivine- and carbonate-bearing lithologies [2, 3] that may have formed by igneous, volcaniclastic, or sedimentary processes (e.g., [4-7]). Samples were collected from *Brac* (topographically high, within the *Séítah* bondaries) and *Issole* (topographically low, near the contact with the *Máaz* fm). Natural surfaces of both *Brac* and *Issole* exhibited horizontal layering at the cm- to dm-scale. They comprise densely packed, relatively coarse (1-2 mm) dark gray grains variably surrounded by lighter-toned interstitial materials. Their mineralogy is (ultra)mafic, dominated by olivine and pyroxene, with large olivine grains protruding from some natural rock surfaces. Minor (several volume %) secondary phases, including carbonates, silica phases, Mg- sulphates and Na-perchlorates, were present; ongoing work will assess the abundance of organic molecules, potentially associated with secondary mineral phases. The Seitah rocks are interpreted as olivine cumulates, extensively altered by fluids [8, 9].

Maaz samples: The *Máaz* fm was inferred to be volcanic because of the remote detection of olivine and pyroxene in the unit, its lobate margins, and embayment relationships [5, 10-12]; however, volcanoclastic and/or sedimentary origins were also posited [13, 14]. Three rocks in the area were sampled: *Roubion*, *Rochette*, and *Sid*. *Roubion* is in a topographically low area of flat-lying, polygonally jointed material. *Rochette* is located along the feature named *Artuby Ridge*, a resistant ledge that can be traced from near the *Roubion* site along the southern edge of the *Séítah* fm boundary. *Sid* represents the stratigraphically capping member of the *Máaz* fm, expressed as massive, blocky rocks that appear to cover much of the Jezero Crater surface. The three *Máaz* fm rocks are fine-to-medium grained, holocrystalline rocks dominated by pyroxene and feldspar, with an overall alkalic nature in contrast to the basaltic nature of martian meteorites (e.g., [15, 16], see also Udry et al. this conference). The mafic grain size appeared to be smallest in *Roubion* and coarsened upward to *Sid*, where several-mm, euhedral feldspar grains are visible. *Roubion* was pervasively altered with abundant secondary phases, *Rochette* and *Sid* contained only minor secondary phases. Mechanical competence corroborated the degree of weathering. Together, these observations imply that the *Máaz* fm is an igneous rock package that has experienced variable degrees of fluid interaction.

Future work: The suite of the *Séítah* and *Máaz* fm samples represents a powerful outcome of the Perseverance Crater Floor campaign that will address several important objectives of the Mars Sample Return campaign [17], including magmatic history, water-rock interactions, environmental conduciveness to life, and isotopic ages for geologic events. Perseverance is now beginning its exploration of the delta facies and will place one of the returnable sample caches near the delta in the upcoming year for Mars Sample Return in the 2030s (see also Herd et al., this conference).

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