



The Analytical Tools (ATLS) experiment within the ESA PANGAEA-X campaign

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The Analytical Tools (ATLS) experiment within the ESA PANGAEA-X campaign aims to identify a complementary suite of instrumentation that will provide useful geological information to the astronauts and to the science backroom team during geologic documentation and sampling activities in the context of future human exploration on the Moon. More generally, it will also aim to test the instruments in an analogue environment to better understand their current strengths and weaknesses in terms of data quality, instrument design, ergonomics, and to provide feedback to their developers. Specifically, our goals are: test how effectively each of the analytical instruments works on the various rock types that will be used as samples for other ESA analogue activities like the experiment of telerobotic Analog-1; observe if the produced spectra display identifiable features; establish what are the confidence levels matching any features identified with database entries; acquire a min/max deployment time for the instruments on specific samples; identify design requirements for future iterations of these instruments; support the database creation for the Analog-1 traverses definition (A1TRAP) characterizing with different analytical techniques the samples selected. Here we report on the field tests of four portable science instruments during the PANGAEA-X 2018 campaigns: a visible-near infrared (VNIR), a Raman, a laser induced breakdown (LIBS), and a x-ray fluorescence (XRF) spectrometer. Each instrument and method is assessed on the various basaltic rock types to examine their performance in terms of the quality of the data produced and the time in which the data was acquired.