



PALEOGEOTHERMAL ALTERATION IN GOVERNMENT CANYON, ELBERTA, UTAH

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The government canyon area appears to have three potential paleo-hot-spring sites that represent conduits of upward and material flow from a crystallizing intrusion at a depth comparable to those of Yellowstone National Park, Wyoming. These areas of interest are greatly eroded today exposing much of the hypothesized hydrothermal alteration minerals. Fifty-two samples of rock have been systematically collected in Government Canyon, Utah. The locations of the samples are plotted on a various maps. This includes the minerals that are plotted on actual satellite images of the area, on the Utah Geological Survey's geologic map, and over a topographic map of the three target areas. This assists us in visualizing trends that are present based on the spatial relations of the alteration. The rock samples have been cut so as to produce a flat surface for analysis. The hydrous alteration minerals in the samples were identified by optical, near infrared and short wave length infrared spectroscopy (Very Near Infra-Red Advanced Spectral Device, VNIR-ASD). Selected samples are being analyzed by X-ray diffraction. The geospatial distribution of alteration minerals alunite, pyrophyllite, illite, dickite, kaolinite and others will be examined and interpreted in the context of alteration models for modern and fossil geothermal systems. It was found that whilst examining the samples collected we encountered numerous minerals that characterize high temperature, acidic, hydrothermal alteration. These rocks tells us about paleoconditions that the samples undergone: (Temperatures ranging from 200-400°C, and acidic pH levels from 1-3). Alteration zones similar to this are recognized to sometimes contain valuable ores such as gold, or copper porphyry deposits. Schematically charting the locations of these altered minerals allows for consideration of the wider geologic context. This process has not been carried out before in Government Canyon, Elberta, Utah.

