

ABSTRACT FORM FOR ALL GSA MEETINGS IN 1989

Complete all sections [3] through [7] below

[1] TYPE ABSTRACT within blue lines — they're absolute! Mail flat, reinforced.

No 6453

[2]

HYDROTHERMAL MINERALIZATION IN THE VICINITY OF ROCKY TOP, WESTERN CASCADES, OREGON

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The Rocky Top area is located within the Western Cascades subprovince of Oregon, approximately 65 km east-southeast of Salem. The area consists of a thick, well exposed sequence of mid-Tertiary calc-alkaline volcanic rocks which record subsequent events of tectonic deformation, magmatic intrusion, and hydrothermal mineralization. Equigranular and porphyritic diorite to granodiorite intrusions exposed at Rocky Top are mineralized and generally crop out as northwest-trending dikes which were emplaced along pre-existing structures. Their spatial distribution and compositional traits provided by major oxide and trace element data suggest that these plutonic rocks and associated mineralization are temporally related to the nearby Detroit Stock (9.7 m.y.; Sutter, 1978). Widespread propylitic alteration in the vicinity of Rocky Top is pervasive and intensifies with proximity to northwest-trending structures and intrusions. Characteristic secondary minerals of this alteration include chlorite, epidote, calcite, albite, quartz, sericite, and pyrite. Late-stage phyllic alteration is characterized by the replacement of phenocrysts and groundmass minerals by quartz, sericite, and pyrite. Minor areas of intense argillic alteration overprint earlier stages of propylitic and phyllic alteration. Phyllic and argillic alteration are localized along structural zones and feature a loss of primary textures which accompanies mild to strong bleaching of the wall rocks. Whereas potassic alteration is not exposed at Rocky Top, several samples from the Detroit Stock contain incipient veinlets and diffuse zones of hydrothermal biotite. Zones of metallization are generally structurally controlled, narrow and weakly developed, and lack evidence of past exploration activity. Metal concentrations range up to 16 ppm Ag, 16 ppb Au, 830 ppm Cu, 75 ppm Mo, 1330 ppm Pb, and 3570 ppm Zn. Sulfide minerals occur as open-space fillings of fractures and as disseminations in the volcanic and plutonic rocks. The principal sulfide is pyrite, although sphalerite, chalcopyrite, and galena are locally abundant in small veins and disseminations associated with phyllic alteration. Sulfur isotope compositions of these minerals range from +1.0 ‰ to -3.3 ‰ and average about -0.5 ‰. This relatively narrow range of $\delta^{34}\text{S}$ values near 0 ‰ is suggestive of a magmatic origin and consistent with data obtained elsewhere from the Western Cascades. Isotopic temperature estimates from coexisting sphalerite and galena indicate sulfide deposition at 200-220°C. Investigation of the interrelationships between mineralization and associated plutonic rocks combined with volcanic stratigraphy, structure, and topography suggest that Rocky Top may be one of the youngest and highest level hydrothermal systems of the Western Cascades.

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[6] SPEAKER'S IDENTITY AND MAILING ADDRESS:

Speaker's Name: John Curless

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