We use triple oxygen isotopes of mineral separates from altered granitic rocks to determine the isotope composition of meteoric waters in a fossil hydrothermal system, the low-δ¹⁸O Eocene Idaho Batholith, originally studied by Criss and Taylor [1]. In doing so we: 1) test whether meteoric water values determined from previous δ¹⁸O and δD analyses on quartz, feldspar and biotite [1] are robust; and 2) determine the paleoelevation of the Eocene highlands that are presently constrained primarily by the δ¹⁸O and δD of paired muscovite and quartz from core complexes [2]. Our analyses of paired plagioclase feldspar and quartz samples range in δ¹⁸O from -3.3‰ to 9.0‰, and 5.7‰ to 10.8‰, respectively, with a strong negative correlation in feldspar Δ¹⁷O (λ = 0.528) ranging from -0.014 to -0.117. Exploiting this correlation, we derive an empirical mixing slope (δ¹⁷O vs. δ¹⁸O) of 0.525 and calculate a meteoric water composition of δ¹⁸O = -12.1‰ (-14.7 to -9.1‰), based on a mixing regression to the meteoric water line. Our results have important implications for future paleoaltimetry studies. First, our calculated δ¹⁸O value of meteoric waters is slightly higher than combined δ¹⁸O and δD measurements in these hydrothermally altered granites (-15‰; [1]) and δD values from muscovite in nearby core complexes (-15.6‰; [2]), suggesting some post crystallization exchange of hydrogen. Second, our results are consistent with a high elevation (3 to 4 km) Eocene highland in the north-western U.S. Cordillera, yet lower than these estimates based on hydrogen isotopes.