Air pollution in Peru is of increasing concern in the face of rising population and the doubling of vehicle sales in the last decade. Air particulate matter PM$_{2.5}$ samples were collected over the 2018 year in the city of Arequipa, Peru. The isotopic composition of water-soluble sulfate in PM$_{2.5}$ is used to constrain sources of air pollution. Sample collection at four sites throughout the city provides spatial variability of sulfate isotope values with proximity to industrial, mining, agricultural, and urban centers. The $\delta^{34}$S values of aerosol sulfate ranged from $+3.6\%$ to $+14.6\%$ (average $+8.9\%$). There is no seasonal variation in $\delta^{34}$S values suggesting that photochemical sulfur oxidation does not change throughout the year. The concentration of sulfate increases during periods of lower planetary boundary layer height suggesting that sulfate is local in origin. Natural sulfate sources were also analyzed for $\delta^{34}$S including basin surface salts (average $+7.4\% \pm 3.1$), evaporite lake salt (average $+19.7\% \pm 4.5$), coastal surface salts ($+16.1\%$), coastal fog (average $+18.3\% \pm 3.8$), and volcanic sulfate (average $+0.3\% \pm 5.8$). We accessed the relative importance of natural versus urban sources. Sources of secondary sulfate in aerosols include a mixture of industrial and vehicle emissions. The primary sources including local volcanic, evaporite lakes, and soil dust are the principal influence on sulfur isotope values.