

Welcome to Earth Matters – field notes on the geology of New Mexico’s Enchanting Landscapes. Celebrating Earth Science Week, I’m Virgil Lueth.

Geologists study change over geologic time by using minerals. One mineral in particular is very useful for both determining the time that has elapsed since it formed and, as a bonus, record the conditions when it formed. This mineral is called “jarosite,” and I call it the most useful mineral in New Mexico and on Mars.

Jarosite can form when water and oxygen react through the weathering of pyrite, also known as fools gold. Jarosite can also form directly from hydrogen sulfide in volcanic and sediment gases, which smell like rotten eggs. Jarosite contains potassium, which allows us to determine the age of its formation. The isotopes of oxygen, hydrogen, and sulfur within jarosite can tell us about the source of water, its temperature, and the origin of the sulfur. Using jarosite, we can determine the weathering history of an ore deposit, or we can determine when the deposit formed and the source of waters that created it.

That’s great for New Mexico, but what about Mars? Jarosite was discovered on Mars by instruments carried aboard the rovers, which are 2 mobile vehicles that have been exploring the planet since 2004. If we could get a piece of that Martian jarosite back to Earth, we could determine when oxygen and water were present on the Martian surface, and where the water might have come from. That’s what makes jarosite so useful, even when it’s from another planet!

Celebrating Earth Science Week, I’m Virgil Lueth of the Bureau of Geology at New Mexico Tech.