

Welcome to Earth Matters...field notes on the geology of New Mexico's Enchanting Landscapes. Celebrating Earth Science Week... I'm Mike Timmons.

So, How can you lose a billion years?

Of the many wonderful geologic features in our enchanted landscape, one is noted more for what is missing rather than what is there. Is that confusing? The clues lie within the Sandia Mountains outside Albuquerque.

Sandia means watermelon in Spanish and for the purposes of this mystery the image of a watermelon is useful. The rind of the watermelon is the sedimentary rock that forms the limestone crest of the Sandia Mountains. The pulp of the watermelon is the underlying Sandia granite. The contact between the rind and the pulp, or the limestone and the granite, is called the Great Unconformity. An unconformity is a gap in the geologic rock record, common in geology. The Great Unconformity is "great" because it represents a huge time gap – 1.1 billion years with no rock record.

Geologists can still determine the history of the Great Unconformity by understanding how granite and limestone rock form. Granite forms deep within the Earth as molten rock crystallizes. Limestone is deposited at the surface of the Earth. Since granites form deep in the crust, the overlying rock material must have been eroded prior to deposition of the limestone. This process takes time; how much time can be determined by dating the rocks. We know the granite is 1.4 billion years old by examining radioactive decay of elements in the rock. Fossils let us know that the limestone is 300 million years old. So, the Albuquerque area is missing 1.1 billion years of geologic record, more than a quarter of Earth's history. As you view the Sandia Mountains and marvel at this geologic wonder, remember, what is missing is also great.

Celebrating Earth Science Week, I'm Mike Timmons of the New Mexico Bureau of Geology at New Mexico Tech.