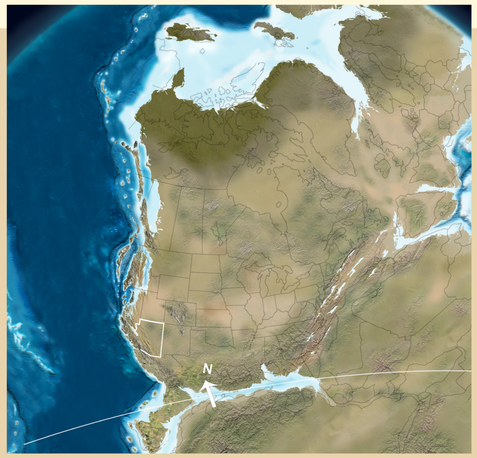
Ancient Roots in the Basement

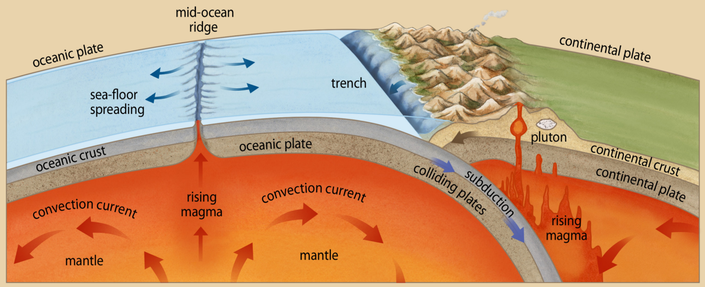


230 mya

A partially-submerged Arizona from about 230 mya. At this point in geologic time, the continents we know today have not yet split from the supercontinent Pangea and Arizona is only slightly north of the equator.

Land in Motion

You may not notice, but the ground beneath you is moving. At a snail's pace, the position of the continents has changed throughout geologic history. For example, between 200 and 250 mya (mid-December on our calendar), the landmass including what is now Arizona was much closer to the equator than it is today. At the rate of less than an inch a year, it took our state more than 200 million years to get where it is now; and the movement continues.



Earth's crust, which varies in thickness from 9 to 124 miles, is made up of interlocking tectonic plates, like pieces of a puzzle. These continental and oceanic plates float like rafts on the planet's mantle. Convection currents in the mantle, like those in a pot of boiling water, keep the plates shifting, causing them to collide or separate. Colliding continental and oceanic plates often result in the subduction (downward movement) of the oceanic plate. As the oceanic crust slides below the continental crust, friction causes rock to melt. Molten rock (magma) either cools below the surface to form plutonic rock (such as granite) or rises to the surface to form volcanoes and volcanic rock.

mantle: 1,800 mile layer of slow-moving rock material between Earth's crust and core where temperatures range from 932 to 7230° F (500 to 4000° C)

Intense compression and squeezing produced the Santa Catalina Mountains' oldest rocks, the basement foundation—**Pinal Schist (A)** and **Oracle Granite (B)**, which you can see surrounding this panel. These rocks are the exposed roots of an ancient mountain range that stretched across much of what is now the American Southwest. The range was uplifted by colliding plates during the Precambrian, about 1800 mya ago (late summer on our calendar), and later eroded away to the schist and granite roots that remain today.

Pinal Schist, a shiny metamorphic rock present in small areas in the northern Catalinas, forms most of the Pinal Mountains south of Globe. It likely correlates to the famous Vishnu Schist found in the deepest gorges of the Grand Canyon. The pinkish Oracle Granite to the right of this panel is plutonic igneous rock formed 1450 mya (September) when magma intruded into the Schist. Near the town of Oracle, exposed Oracle Granite is visible at surface-level.

Oracle granite in Oracle State Park

uplift: to cause a portion of the earth's surface to rise above adjacent areas

igneous rock: any of the major rocks that have crystallized from a high-temperature molten liquid or magma

plutonic rock: crystalline rock formed by solidification of magma deep beneath Earth's surface

Lofty By Any Name

17th century explorer, missionary and cartographer, Father Kino is credited with naming Tucson's most prominent mountain range in honor of Saint Catherine—Sierra de la Santa Catarina—which became, over time, the Santa Catalinas. To the Tohono O'odham, the native people of this region, the 9,000-foot peaks have always been Babad Do'ag or Frog Mountain.

Pre-Columbian pottery frog replica; statue of Father Kino in central Tucson