



Arizona Rocks 17

Text and photos by Ray Grant

The last clastic sedimentary rock we will discuss is usually called shale, but mudstone, claystone, and siltstone are also used. There are two size designations 1/16 mm to 1/256 mm (silt forming siltstone) or less than 1/256 mm (clay forming mud or clay stone). Since these sizes are too small to be seen without fancy equipment; geologists commonly use shale as the name for these rocks. Shale is the most common sedimentary rock as it forms from clay that resulted from the weathering of feldspar, and since the feldspar minerals are the most common in the earth's crust, lots of clay is formed. But shale also weathers and breaks down quickly so we don't usually see the spectacular outcrops like those of sandstone.

The environments where shale is formed will be places where mud is deposited, places like river flood plains, ocean bays, lakes, anywhere the transporting water is moving slowly or has stopped moving. The most famous shale formation in Arizona is the Chinle Formation, it makes up the Painted Desert and the rocks in the Petrified Forest. It formed from river and swamp deposits in the Triassic and the trees were buried in the mud. Other shale formations in the Grand Canyon include the Bright Angel Shale that was deposited off shore in the ocean, the Hermit Shale and the Watahomigi Formation that are mainly river flood plain deposits. Because shale weathers readily it forms slopes or low rounded hills.

Mitten Butte in Monument Valley, the top cliff forming unit is the DeChelly Sandstone and the lower slope forming unit is the Organ Rock shale. There are a couple of sandstone layers in the lower unit that form steps.



Chinle Formation in the Petrified Forest/Painted Desert, typical rounded hills formed from shale.



Chinle Formation in the Petrified Forest with resistant petrified wood weathering out of the shale.



Shale layers exposed in the Grand Canyon; the shale layers form slopes.

