Soil Parent Materials

Soil forms from different parent materials; one such parent material is bedrock. As rocks become exposed at the Earth's surface, they erode and become chemically and physically altered. The type of soil that forms depends on the type of rocks available, the minerals in the rocks, and how minerals react to temperature, pressure, and erosive forces. Parent materials that form in place from the weathering of rock in place are called *residuum*. The major types of rocks that weather to form residuum are igneous, sedimentary, and metamorphic.

Igneous rocks, under the right environmental conditions, can change into sedimentary and metamorphic rocks. Volcanoes produce igneous rocks such as granite, pumice, and obsidian.

Sedimentary rocks are formed when older rocks are broken apart by plant roots, ice wedges, and earth movements and become transported by glaciers, waves, currents, and wind. The transported particles then become bound together (cemented) as secondary minerals grow in the spaces between the loose particles and create a new, solid, sedimentary rock. Sandstone, limestone, and shale are types of sedimentary rocks that contain quartz sand, lime, and clay, respectively.

Metamorphic rocks form when pressure and temperature, below Earth's surface, are great enough to change the chemical composition of sedimentary and igneous rocks. Metamorphic rocks, such as quartzite, marble, and slate, form under intense temperature and pressure but were originally quartz sandstone, limestone, and shale.

Other types of parent material that mineral soils form from are called **Recent Cover Deposits** and include *alluvium, colluvium, eolian deposits, glacial deposits, lacustrine (lake) deposits,* and *loess deposits*.

Alluvial Deposits - rock debris that has been eroded into fine sediments that are subsequently transported by a mountain stream or river to the valley floor, as the gradient of the mountain decreases. Sediment is subsequently deposited on *flood plains and terraces*.

Colluvial Deposits - materials that move downslope by force of gravity and/or erosion and collect on footslopes and toeslopes at the base of mountains or foothills, with little or no sorting.

Eolian Sand Deposits - sandy materials deposited by blowing winds into dune formation..

Loess Deposits - Loess is comprised primarily of wind-blown silt grains, with less significant amounts of clay and sand. Glacial outwash debris containing sand, silt, and clay is transported to flood plains by rivers that drained glacial meltwater. The glacial debris, primarily the silt and

clay, becomes airborne via strong winds as vegetation is not present to hold sediment down. Loess can sometimes become suspended several kilometers high and hundreds of kilometers in distance, with tens to hundreds of tons of sediment being transported in a single "dust storm," as was the case in the 1935 dust storm over the Midwestern United States. Near Wichita, Kansas, a dust storm had suspended about 5 million tons of sediment over a 78-square kilometer area and around 300 tons per square kilometer of dust was deposited from the same storm near Lincoln, Nebraska. Loess deposits are found in the western parts of West Virginia on the western-facing hill slopes next to the Ohio River Valley.

Glacial Deposits - Glaciers did not enter West Virginia, but meltwaters from glaciers in northern Pennsylvania moved down the Ohio River channel. These meltwaters carried sediment from the glaciers and deposited them on terraces along the Ohio River. These materials can be identified because they have fragments of igneous and metamorphic rocks that do not occur anywhere else in the State.

Lacustrine Deposits - Lakes are nearly closed systems, and tides in lakes are less pronounced than in oceans. Therefore, energy levels in lakes are lower, and coarser sediment (sand and gravel) is deposited in shallow **water** areas of lakes, especially during summer, while finer-grained sediment (silt and clay) is deposited in deeper **water** areas of lakes, and more so during winter. Varves, alternating thin layers of light-colored, coarser-grained sediment and dark-colored, finer-grained sediment, are one type of lacustrine deposit and form in both glacial and nonglacial lakes.