The Cahaba basin, a northeast-southwest orientated sub-basin of the Greater Black Warrior Basin. This was a foreland basin during the Pennsylvanian and Permian period which holds a maximum of 2.5 km Pottsville Formation. This formation overlies the Upper Mississippian – Lower Pennsylvanian Parkwood Formation throughout the Cahaba synclinorium and underlain by the Cretaceous Tuscaloosa Formation.

The sequences in Pottsville Formation are cyclothemic and consist of alternating sandstone, siltstone, claystone, shale and several coal beds with quartzose sandstone and conglomerates (Mack et al., 1983). Pashin and Carroll (1999) subdivided these cyclothemic clastic wedges into three major magnafacies, the lower Quartzarenite/Sandstone Measure, the middle Mudstone Measure, and the upper is Conglomerate Measure. (Figure 5) shows the composite stratigraphic column of the Pottsville Formation in the Cahaba synclinorium and adjacent areas. The upper 800 meters of the Pottsville Formation consist mainly of coarse conglomerate, sandstone, shale and coal.

METHODS

Conglomerate samples were collected from two separate bore holes named the Joy Manufacturing H.B. and SOMED (School of Mine and Energy Division) cores from the core repository of the Alabama Geological Survey the conglomerate core samples.

RESULTS

The following compositional parameters were distinguished and counted; Qt = total quartz, Qm = monocrystalline quartz, Qp = polycrystalline quartz, Ls = sedimentary lithics, Lm = metamorphic lithics, Lv = volcanic lithics, plagioclase, k-feldspar, and chert. To determine the provenance field, modal compositions were plotted on standard ternary diagrams (Qt-F-L, Qm-P-Lt, Qp-P-Ls, and Qm-PK).

SUMMARY

Conglomerates from J.M and SOMED cores mainly consist of chert, metamorphic, sedimentary and volcanic lithic fragments. Carbonate clasts also are present, along with large fragments of chert that appear to be derived principally from the Cambrian-Ordovician Knox Group. So the most prominent source of chert might be Cambrian-Ordovician carbonate rocks, lower part of the Copper Ridge Dolomite, which is the basal unit of the Knox Group in Tennessee. The abundance of metamorphic and metasedimentary rock fragments suggest a collisional orogen provenance. Furthermore, the presence of rutil and garnet suggests a medium- to high-grade regionally metamorphosed source in the southern Appalachians. The large size of sedimentary and metasedimentary clasts suggest an adjacent source of the conglomerates. The presence of quartzite, volcanic rock fragments, and schists suggest the source containing metamorphic and volcanic rocks. The QtFL, QmPK, QmFLLt, and QpLvLs plots suggest a collisional orogen to recycled orogenic belt provenance. Therefore, the petrographic analysis of conglomerates suggests a part of the sediments were derived from the source terranes in the Appalachian Mountains to the east and northeast.

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