**ABSTRACT**

A previously undocumented sequence of sedimentary rocks has been identified within SW Montana and informally termed the Teddy Creek Group (TCG). This project focuses on the field relations, mineral compositions, and textures of these rocks to determine their origin and relationship to the regionally extensive Renova Formation. The TCG consists of a basal pebble-conglomerate with distinctive black clast cements overlain by sandstones interlayered with white-purple volcanic ash. All lithologies have experienced an episode of post-deposition alteration. Petrographic analysis reveals sandstones are compositionally mature with high abundances of quartz and minor amounts of feldspar and muscovite mica. Most grains and lithic clasts are subrounded-rounded, however monocrystalline quartz grains are subangular-angular. The TCG also preserve cross-bedded laminations indicating a fluval depositional environment as well as fragments of petrified wood.

In contrast, the Renova Formation consists mainly of tuffaceous sandstones containing abundant muscovite and biotite micas. The presence of the muscites is attributed to the unroofing of the Idaho batholith. However, the lack of micas, especially biotite, in the TCG suggests a different source than the Renova Formation.

**PROJECT OBJECTIVES**

- Document mineralogy & textures within the Teddy Creek Group
- Characterize the transport history that deposited this sediment
- Evaluate field relations between the Teddy Creek Group and the regionally extensive Eocene Eocene age Renova Formation

**LOCAL GEOLOGIC SETTING**

The Teddy Creek Group (TCG) occurs within the Rocky Mountain Basin and Range province of the western U.S. Cordillera. The Blacktail Mountains are one of numerous basement-cored uplift blocks that occur throughout SW Montana. Basement rocks consist of Archean metamorphic gneisses and Proterozoic mafic intrusions. In the northern portion of the Blacktail Mountains, the basement rocks are overlain by a sequence of Paleozoic and Mesozoic sedimentary rocks. However, in the southern portion of the mountain range, these rocks have been eroded away, and Cenozoic sedimentary rocks unconformably lie on metamorphic basement. The basin is a monoclinal monocline called the Price Creek Unit (PCUv). The TCG unconformably overlies the PCU with cobbles of PCUs within the basal unit of the TCG.

**SUMMARY**

- Teddy Creek Group sandstones plot within the recycled craton field implying it was derived from pre-existing sedimentary and metamorphic rocks at a convergent plate margin.
- Renova sandstones plots within the dekrivert arc field indicating a volcanic arc source and in agreement with the composition of the Idaho batholith.
- Field relations, mineral compositions, and textures suggest the TCG is distinctive regionally and older than the regionally extensive Renova Formation. Previous workers argue that the Renova sandstone was derived from the unroofing of the 80 Ma Idaho batholith into a broad, low-topography basin.
- The origin of the Teddy Creek Group may suggest the existence of high-standing topography in the Late Cretaceous, which may well have persisted into the Miocene.

**FUTURE WORK**

- Re-O/Pb laser dating of single crystals of muscovite micas to determine the age of the source rocks for the Teddy Creek sandstones.
- Ages will help confirm or refute the relationship between the Teddy Creek Group and the Renova Formation.
- Mammal micas ages may shed new information on the possibility that the modern landscape may have existed prior to 4 million years ago, which many workers speculate.

**REFERENCES CITED**


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