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EVIDENCE FOR A MAJOR, EARLY PROTEROZOIC OROGENIC EVENT IN THE TOBACCO ROOT MOUNTAINS OF SOUTHWESTERN MONTANA

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In Session 71 Precambrian Geology (Posters) Tuesday, Tuesday, October 26, 1999 AM in Room: Poster Hall at 08:00 AM for .

Abstract: Precambrian rocks in the Tobacco Root Mountains are dominated by the Archean Indian Creek Metamorphic Suite (ICMS) and Pony-Middle Mountain Metamorphic Suite (PMMMS) (**Brady** et al., 1994). The ICMS and PMMMS possess a strongly developed gneissic banding which is cut by mafic dikes and sills (MMDS). The MMDS have a weakly developed foliation, contain a metamorphic mineral assemblage of $\text{gar}+\text{plag}+\text{cpx}+\text{hbl}+\text{qz}+\text{ilm}+\text{opx}$, and are folded, boudinaged, and sheared. Small (30 μm) grains of zircon and badellyite from MMDS samples yield $^{207}\text{Pb}/^{206}\text{Pb}$ ages of 2100-2000 (crystallization age?) and 1770 Ma (metamorphic age). The Spuhler Peak Metamorphic Suite (SPMS), interpreted as an allochthonous sequence (**Brady** et al., 1994), is structurally juxtaposed with both the PMMMS and ICMS. U/Pb ages from detrital zircons in an SPMS quartzite suggest an Archean age for the unit. Overgrowths on the detrital zircons yield an approximate age of 1750 Ma. New zircon grains from a pelitic melt zone associated with a boudinaged amphibolite in the SPMS give a $^{207}\text{Pb}/^{206}\text{Pb}$ age of 1770 Ma.

$^{40}\text{Ar}/^{39}\text{Ar}$ ages for hornblendes from the SPMS, ICMS, and PMMMS (**Brady** et al., 1994; Kovaric et al., 1996) give a mean age of 1700 Ma. Ion-probe (UCLA) Th/Pb ages from monazites in ICMS, PMMMS, and SPMS samples yield ages ranging from 1775-1620 Ma (Cheney et al.). Geothermobarometry obtained from MMDS, SPMS, PMMMS, and ICMS rocks indicates all experienced similar pressures and temperatures of 7-9 kb and 650-750°C (Burger et al., 1998; Cheney et al., 1996, 1998). Structural analysis of folds and mineral fabrics from all four units presents a coherent structural picture (Harms et al., 1996). These structural, petrologic, and geochronologic relationships document a major thermotectonic event in the Tobacco Root Mountains in the Early Proterozoic at approximately 1770 Ma that involved emplacement of the SPMS, major folding, intense simple shear, high-grade metamorphism, and local melting.

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