Presentation Time: 10:20 AM

GEOLOGY AND U-PB GEOCHRONOLOGY OF THE ERNIE LAKE AREA, CENTRAL BROOKS RANGE (ALASKA): IMPLICATIONS FOR CRETACEOUS ALLOCHTHON STACKING, PALINSPASTIC RESTORATIONS, AND PRE-CRETACEOUS ARCTIC TECTONICS

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The Ernie Lake area has long been recognized as hosting some the oldest rocks in the Brooks Range and as such potentially provides details regarding the basement to stacked allochthons. Original maps imply that the “basement” rocks are unconformably overlain by Mississippian or Late Devonian clastic rocks as well. To constrain the ages and relationships of these rocks, and improve our understanding of palinspastic restorations and allochthon stacking sequences, we mapped and performed U-Pb geochronology on three packages: (1) variably deformed Ernie Lake granitic orthogneiss (ELO) bodies previously assigned an age of ~970 Ma, (2) lithologically diverse metsedimentary rocks surrounding the ELO bodies (herein the Ernie Lake complex, ELC), and (3) an overlying N-dipping package of clastic rocks previously assigned Devonian or Mississippian ages (herein Unit Mc).

Five samples from the compositionally homogeneous main ELO body yield Cryogenian ages (~643 ±2 Ma to 658±2 Ma); one sample from the body immediately to the east previously dated at ~970 Ma yielded a population of concordant zircons at 653±4 Ma and a population of earliest Tonian ages, which we now interpret as inherited zircons. All samples combined yielded >40% of dated zircons that give pre-Cryogenian ages (~950-1800 Ma) interpreted as inherited xenocrystic zircons.

Detrital zircons (DZ) from six ELC samples (N=355) are dominated by ~1.0 to 1.8 Ga grains; two samples also have a small ~950 Ma population and another has a few (N=11) grains at ~2.6-2.7 Ga. We interpret a Neo- or Mesoproterozoic protolith age for the ELC based on the ~950 Ma youngest DZ grains and intrusive relationships with the Cryogenian intrusions. Metamorphic titanite from a calc-quartzite yielded an age 628±16 Ma, consistent with this interpretation.

Five DZ samples from Unit Mc yield predominantly ~460-370 Ma ages along with more discordant ages at ~950-1800 Ma and a few grains at ~2.5-2.7 Ga. A sample low in the section yielded three concordant ages at ~340 Ma suggesting a Mississippian age and correlation with the Kekiktuk conglomerate.

The new data suggest correlation of the ELO-ELC with other circum-Arctic Cryogenian magmatic-metamorphic terranes and support juxtaposition of different basement blocks prior to or during widespread deposition of Mississippian clastic units.

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T23. The Geological Evolution of Northern Alaska: A Session in Honor of Charles ″Gil″ Mull
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