GRAPTOLITE AND CONODONT FAUNAS IN ORDOVICIAN VININI FORMATION, ROBERTS MOUNTAINS, CENTRAL NEVADA, DEMONSTRATE THAT THE ROBERTS MOUNTAINS ALLOCHTHON IS NOT AN EXOTIC TERRANE

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Two very different plate-tectonic models have been proposed to explain the development and emplacement of the Robert Mountains allochthon (RMA) onto the North America craton during the Late Devonian-Early Mississippian Antler Orogeny. In one model, the RMA represents a far-traveled accretionary prism that migrated eastwards over a west-dipping subduction zone. In the other, the eugeoclinal strata of the RMA were deposited on the continental rise of western North America within a closed back-arc basin. Siliciclastic sediments, especially quartz sandstones, compose much of the RMA, yet knowledge of their provenance is poor even though such knowledge is essential for evaluating the two plate-tectonic models.

We have recently obtained large collections of graptolites and conodonts from turbiditic quartz sandstones in the Lower Member of the Vinini Formation in the Roberts Mountains. These sandstones of lower Whiterockian age are correlative with the lower Antelope Valley Limestone that deposited on the western shelf of North America. The diverse graptolite fauna represents the oceanic isograptid fauna. However, it also includes pendent didymograptids and rooted dendroids that were restricted to shallow shelf seas. The dendroids (Cactograptus, Dendrograptus, Desmograptus, and Dictyonema) were benthic organisms, could not have lived in a deep marine setting, and are also common in shallow-water carbonate strata of western Utah. All specimens within the turbiditic quartz sandstones of the Vinini were broken before final deposition and burial, but specimens from Utah are generally complete. The diverse conodont fauna is virtually identical to that found in the lower Antelope Valley Limestone, as well as in coeval strata in western Utah. Although it includes a few deep (cold) water, cosmopolitan species, it is dominated by species that are otherwise known only from shallow water strata deposited on the North American craton.

We conclude that turbidity currents transported these exotic graptolites and conodonts down from the shelf and onto the rise along with the quartz sands in which they occur. Thus, the Whiterockian quartz sandstones in the Vinini Formation must have a North American provenance just as the fossils do. This is strong evidence that 1) the RMA is not exotic to North America, 2) the eugeoclinal strata of the RMA were deposited on the western continental rise of North America and on the eastern side of a back-arc basin, and 3) the RMA was thrust onto the western shelf of North America by closure of this back-arc basin.

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