

Early Cretaceous Evolution of the Northern Great Valley Forearc Basin from Detrital Zircon Provenance Analysis, Sacramento Valley, California

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Detrital zircon age spectra from the Lower Cretaceous Great Valley Group record multiple provenance shifts not evident in petrofacies or paleocurrent data. Six samples spanning the Lower Cretaceous stratigraphy fall into two detrital zircon age spectra types: 1) polymodal age distributions, which occur at the base and top of the Upper Jurassic-Lower Cretaceous strata (Stony Creek petrofacies) and in the middle and top of the Lower Cretaceous strata (Lodoga petrofacies); and 2) unimodal age distributions, which occur in the middle of the Stony Creek petrofacies, at the base of the Lodoga petrofacies, and at the base of the Upper Cretaceous strata. The polymodal age distributions contain ages characteristic of both the Klamath Mountains to the north and the northern Sierran terranes to the east, consistent with previous interpretations that the Lower Cretaceous strata were deposited by longitudinal drainage (south-directed) from the Klamaths fed by transverse drainage (west-directed) off the northern Sierran terranes. The provenance of samples containing Late Jurassic-Early Cretaceous unimodal age distributions remains uncertain, as current exposures of plutons of this age are limited in both the Klamaths and the Sierras. However, the most proximal source for the unimodal age distributions are plutons within the westernmost northern Sierran terranes and now-covered plutons buried by Upper Cretaceous Great Valley strata. If the provenance of samples with the unimodal signature is limited to the northern Sierran terranes, then the multiple shifts from polymodal age distributions with widespread provenance to unimodal age distributions with more localized provenance suggest episodic tectonism in the young arcforearc system that temporarily localized sediment sources. Syndepositional sinistral normal faulting in the northern Great Valley may have episodically blocked longitudinal drainage within the Upper Jurassic-Lower Cretaceous basin, resulting in the recurring appearance of unimodal Late Jurassic-Early Cretaceous age distributions with provenance limited to the northern Sierran terranes.