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Tectonic implications of diverse igneous blocks in Franciscan mélange, Northern California and southwestern Oregon

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ABSTRACT

More than 50% of the igneous blocks from mélanges of the Franciscan subduction complex in northernmost California and from the equivalent Dothan Formation of southwestern Oregon are more silica-rich than basalt, and some contain supra-subduction zone geochemical signatures such as elevated Th/Ta ratios. In contrast, blocks from more southerly parts of the Franciscan mélange belt are more commonly mid-ocean ridge and ocean island/seamount basalts. The data indicate a north-south variation in the block population, due to differences in source terrane, or in the processes that provided the blocks and transported them into the mélange, or both. We suggest that, in the northern Franciscan, a relatively greater fraction of igneous mélange blocks was emplaced by block slumping from the forearc crust into the trench than was the case to the south.

Keywords: Franciscan, igneous blocks, mélange, geochemistry