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## Interplay between melt infiltration and strain localization in the lower lithosphere of San Quintin, Baja California

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How strain localizes in the lower crust and upper mantle to accommodate transcurrent plate motions is not well understood. Here we focus on a suite of lower crustal and upper mantle xenoliths from the San Quintin Volcanic Field (SQVF) in Baja California, Mexico, located along transcurrent faults at the margin of the Pacific plate. Previous work has suggested that in addition to significant strain localization, the lower lithosphere below SQVF has experienced partial melting, possibly through shear heating. The presence of even minor amounts of melt could significantly affect the deformation mechanisms accommodating strain. While previous studies of SQVF have largely focused on deformation in the upper mantle, less is known about strain localization in the lower crust. We have analyzed the composition and microstructures of nine xenoliths using wavelength dispersive spectroscopy (WDS) and electron backscatter diffraction (EBSD) to elucidate the relationship between melt infiltration and deformation in the lower crust of this actively-deforming region.

We categorize the suite of SQVF xenoliths into two textural and chemical groups: Group 1, consisting of undeformed mafic cumulates, and Group 2, consisting of foliated ultramafic peridotites and mafic granulites. Symplectites and corona textures with olivine-orthopyroxene-clinopyroxene+spinel symplectite-plagioclase layering preserved in Group 2 samples are interpreted to have resulted from basaltic melt infiltration during deformation. The orientation of the shape preferred orientations (SPO) of spinel and orthopyroxene grains relative to foliation in Group 2 samples is consistent with experimental studies of crystallization during melt infiltration. Evidence for deformation is also preserved in the form of moderate crystallographic preferred orientations (CPO), present in plagioclase, orthopyroxene, and olivine. Oxide weight percentages, calculated using electron microprobe data and modal phase abundances from WDS maps, were used to construct pseudosections in order to estimate equilibrium temperatures and pressures. The range of pressures across samples suggest a changing degree of deformation and degree of rock-melt interaction with depth in the lower crust of Baja California.