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Jadeitite: a record of metasomatism at various depths in Guatemalan subduction zones

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Jadeitites crystallize from hydrous subduction-related fluids in serpentinizing peridotite. The strike-slip Motagua Fault in Guatemala has brought jadeitites to the surface several times. Along the north side of that fault we studied 8 jadeitite locales along 65 km of E-W strike, and on the south side 3 locales along 15 km. We identified at least 4 distinct PTx settings for jadeitite.

Jadeitites north of the fault are all quite similar, light colored and altered by late-stage fluids. The presence or absence of potassic phases may be a further subdivision. A modest jadeite (Jd) – omphacite (Omph) gap and zoisite suggest 300-400°C. Absence of quartz (Qtz) and common albite (Ab), mica, and late analcime (Anl) suggests P = 6-10 kb. Albitites are common, implying further fluid crystallization at lower P and higher a_{SiO_2}. The associated rocks are garnet-zoisite-amphibole (with some retrograde eclogite) and omphacite-taramite metabasites.

The southern jadeitites are subdivided as follows:

1- San Jose jadeitites are green to blue-green with late omphacite veins and little alteration. A larger Jd – Omph gap and lawsonite suggest 300-400°C, and higher P as indicated by Qtz at P = 12-20 kb. Lawsonite eclogites (P = 20-25 kbar, T = 350-450°C) occur with these jadeitites.

2- La Ceiba jadeitites are moderate to intense dark green, occasionally lavender, with veins of quartz, diopside, cymrite, and vesuvianite. A large Jd – Omph gap suggests 300-400°C and, as indicated by Qtz $\pm$ Ab, P = 10-14 kb. These coexist with omphacite-glaucophane blueschists.

3- La Ensenada jadeitites are whitish with green, blue, orange, and mauve. A large Jd – Omph gap and pumpellyite suggests <200-~300°C at lower P=6-9 kb as indicated by primary Ab and secondary Anl. These are very low in iron and coexist with pure clinochlore and magnetite, which all suggest ferrous iron removal by a fluid. These are found with lawsonite-glaucophane blueschists and chloritite.

These four types of Guatemalan jadeitite record differences in fluid composition, crystallization T and P, and a variety of sodic metasomatic processes.