ABSTRACT

HOT AND DEEP: ROCK RECORD OF SUBDUCTION INITIATION AND EXHUMATION OF HIGH-TEMPERATURE, HIGH-PRESSURE METAMORPHIC ROCKS, FEATHER RIVER ULTRAMAFIC BELT, CALIFORNIA

A thin (<300 m) unit of high-grade metamorphic rocks found at the base of the Feather River ultramafic belt (FRB) interpreted to be a metamorphic sole yields insight into subduction initiation and ophiolite emplacement. Peak metamorphic conditions were determined by grt-cpx-phengite thermobarometry, which yielded results of 650-760°C at 1.4-2.2 GPa for the unit. Amphibole thermobarometry yielded results of 650-720°C at 1.6-1.9 GPa for the structurally high part of the unit and 550-650˚C at 1.3-1.7 GPa for the structurally low part of the unit. These results are consistent with the sole having formed during the inception of subduction.

P-T conditions were also determined using amphibole thermobarometry for an amphibolite lens interleaved within the FRB (550-700˚C at 1.2-1.8 GPa) and a sheeted dike from the structurally higher Devil's Gate ophiolite (705˚C at 0.3-0.7 GPa). The pressure contrasts indicate that exhumation of the high-grade rocks occurred on at least two major zones.

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December 2008