Geophysical Research Abstracts,
Vol. 10, EGU2008-A-07990, 2008
SRef-ID: 1607-7962/gra/EGU2008-A-07990
EGU General Assembly 2008

Pelitic and mafic eclogite-granulites from NW Bhutan: PT history and tectonic implications

C.J. Warren (1, 2), J. Chakungal (1, 3), D. Grujic (1), R.A. Jamieson (1), D. Moynihan (1), K. S. Ghalley (4) and D. Wangda (4)

(1) Department of Earth Sciences, Dalhousie University, Halifax, Nova Scotia, B3H 4J1, Canada, (2) Now at the Department of Earth and Environmental Sciences, The Open University, Walton Hall, Milton Keynes, MK7 6AA, U.K,. (3) Now at the Nunavut Geoscience Office, Iqaluit, Nunavut X0A 0H0, Canada, (4) Department of Geology and Mines, Ministry of Trade and Industry, Thimphu, Bhutan.

(c.warren@open.ac.uk / Fax:+ 1 902 4946889 / Phone: +1 902 4942208)

High pressure (HP) granulites have been described from a variety of Proterozioc to Phanerozoic orogenic belts. Their high recorded pressures and temperatures ($P >$1.4 GPa and $T > 750^{o}$C) suggest that continental crustal roots or subducted crust may experience high thermal regimes. Their presence in young continental collision belts, such as the Himalaya, however requires that heating and exhumation take place on short timescales ($\leq$ 20 Ma). In NW Bhutan, a $\sim$2 km thick zone containing mafic and ultramafic rocks is exposed within the core of a major antiform $\sim$1-2 km below the South Tibetan Detachment. The mafic and ultramafic layers and boudins are hosted by intensely foliated and migmatitic metapelites, quartzites, calc-silicates, and augen gneisses. The metabasic rocks retain evidence for an early *HP* event (eclogite or *HP* granulite), followed by decompression and probable heating to medium-P granulite before subsequent cooling. The *HP* assemblage consisted of garnet, inferred omphacite (now replaced by a lacy symplectite of plagioclase + clinopyroxene), quartz, and rutile. The overprinting *HT-MP* granulite assemblage contains clinopyroxene, orthopyroxene, garnet, plagioclase, and accessory ilmenite. This assemblage requires significant decompression from the *HP* conditions, as suggested by orthopyroxene and plagioclase coronas on matrix clinopyroxene and clinopyroxene-orthopyroxene coro-

nas between garnet and quartz. Pressure-temperature-time (*PTt*) paths inferred from both the mafic and metasedimentary rocks provide crucial geodynamic constraints on the India-Asia collision process, such as the timing of maximal burial of the Indian crust, and the continuity of its subsequent exhumation.