

# Titanian clinohumite and chondrodite in antigorite serpentinites from Central Chile: evidence for deep and cold subduction

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## Abstract

Humite minerals, including Ti-rich, hydroxyl-dominant chondrodite and clinohumite, occur in Paleozoic antigorite serpentinite in the La Cabana area, in the Chilean Coastal Cordillera (similar to 38 degrees 30'S- 73 degrees 150'W). This may be the first report from South America. Humite minerals are intergrown with Mn-rich olivine hosting antigorite blades in textural equilibrium, indicating a metamorphic origin. A comparison with previous results from piston-cylinder experiments and petrological studies of other high-P serpentinites constrains the formation conditions of the humite + olivine + antigorite assemblage to ca. 2.0-2.5 GPa and < 600 degrees C. Thus, the assemblage is interpreted as having formed during cold subduction of a segment of oceanic lithosphere to a depth >60 km, suggesting that the Paleozoic serpentinites were entrained into the mantle at higher P-T conditions than those experienced by the spatially associated olivine-lizardite metadunites and enclosing metasedimentary rocks (subducted to < 30 km). During exhumation along the subduction channel, high-P serpentinites together with metadunites underwent tectonic mingling with metasediments of the accretionary prism, preserving their signature of distinct metamorphic trajectories. This could be similar to the tectonic evolution of blueschists and high-P amphibolites found as isolated blocks in the metasediments of the Chilean Coastal Cordillera.

## Keywords

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**KeyWords Plus:**[SOUTH-CENTRAL CHILE](#); [PALEOZOIC ACCRETIONARY COMPLEX](#); [PAIRED METAMORPHIC BELT](#); [CERRO DEL ALMIREZ](#); [HUMITE MINERALS](#); [TI-CLINOHUMITE](#); [LA CABANA](#); [COASTAL CORDILLERA](#); [CHLORITE HARZBURGITE](#); [ULTRAMAFIC COMPLEX](#)

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