

# Geochemical Characterization of Serpentinized Peridotites from the Shergol Ophiolitic Slice along the Indus Suture Zone (ISZ), Ladakh Himalaya, India

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## ABSTRACT

The Shergol ophiolitic slice is a dismembered ophiolite consisting predominantly of serpentinized peridotites along the Indus Suture Zone, Ladakh Himalaya, India. On the basis of modal mineralogy, Shergol serpentinized peridotites can be identified as spinel-bearing harzburgites. The characteristic U-shaped rare earth element (REE) patterns and whole-rock heavy-REE concentrations correspond to those of abyssal mantle rocks from mid-ocean ridges. Evaluation of Cr-spinel mineral chemistry reveals that they represent the residues left after low-to-moderate degrees of partial melting (<15%) in the spinel stability field in a mid-oceanic ridge tectonic environment. The whole-rock geochemistry suggests that the studied rocks represent a mantle residue left after removal of basaltic melts in the context of an ancient Jurassic-Cretaceous Neo-Tethys oceanic mantle section.

**Online enhancements:** appendix.

## Introduction

Ophiolites are the fragments of upper mantle and oceanic crust (i.e., oceanic lithosphere) representing ancient ocean basins (Cann 1970; Dewey and Bird 1971; Coleman 1977; Nicolas 1989) incorporated into continental margins during continent-continent and arc-continent collisions (Dilek and Flower 2003). They are generally found along collisional-type suture zones (e.g., Alpine, Himalayan, Appalachian) and accretionary-type orogenic belts (e.g., North American Cordilleran) that mark major boundaries between amalgamated plates or accreted terranes. The importance of on-land study of ophiolites is immense, as they represent the only suitable source of direct information about the character and composition of the old oceanic lithosphere that will help in understanding the modern oceanic lithosphere.

The ultramafic rocks and other diagnostic lithological types with well-preserved oceanic features that characterize most of the world's known op-

hiolite sequences occur in the Ladakh Himalaya along the Indus Suture Zone (ISZ; Gansser 1980; Srikantia and Razdan 1980; Sharma 1989; Sinha and Mishra 1992; Mahéo et al. 2004, 2006). This important tectonic setting and its ophiolitic character add to the geological significance of these rocks.

In this article, we present the first whole-rock major- and trace-element compositions, including rare earth element (REE) data, of serpentinized peridotites from the Shergol ophiolitic slice, representing one of the ophiolites of the Ladakh Himalaya along the ISZ. The study also aims at discussing the petrogenesis and tectonic setting of these serpentinized peridotites.

## Geological Setting

The Ladakh Himalaya (fig. 1a) occupies the central position in the Himalaya; it is separated from the Kohistan area to the west by the Nanga-Parbat massif and is cut off from the Lhasa block to the east by the Karakoram strike-slip fault (Gansser 1980; Srikantia and Razdan 1980; Raz and Honegger 1989).

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