Aquatic Geochemistry
https://doi.org/10.1007/s10498-019-09364-9

ORIGINAL ARTICLE

# Mineral Magnetic and Geochemical Mapping of the Wular Lake Sediments, Kashmir Valley, NW Himalaya

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Received: 22 July 2019 / Accepted: 6 December 2019


**Abstract**
This study presents major element geochemistry, mineral magnetism and textural analysis of lake-bottom sediments collected from the Wular Lake located in the Kashmir Valley (northwest Himalaya). Connected to the Jhelum River, Wular Lake basin occupies ~ 75% watershed area of the valley, covering ~ 10,196 $km^2$, and makes it the major depo-centre for Kashmir Valley. The sediments represent dominant silt fraction with $TiO_2$, MgO, $Fe_2O_3$ and MnO enrichment; and depletion of $Na_2O$ and $P_2O_5$ with reference to upper continental crust. The average CIA (64.17%) reflects moderate chemical weathering of the catchment source rocks. The mineral magnetic mapping identified distinct domains of restricted/reducing and well-ventilated/oxic conditions, illustrating spatial environmental variability within the lake-bottom environments. The geochemical and mineral magnetic mapping therefore provides a baseline reference for emerging climate and anthropogenic changes being experienced in the Kashmir Valley.

**Keywords** Kashmir valley · Limnology · Geochemistry · Mineral magnetism · Sediment provenance

## 1 Introduction

Lake sediments preserve paleo-ecological records in valley basins that can be investigated for anthropogenic, climatic and lithogenic changes (Ma et al. 2016). Studies on lake environments can lead to an understanding of the natural earth surface processes involved in transport and deposition of detritus sediments in the lake basin, and the ability of lake system to maintain an eco-balance between the storage and output of sediments and nutrients. Apart from understanding the geo-ecological conditions around the

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Published online: 13 December 2019