

ネパールヒマラヤ東部、エベレスト地域の地質：地学研修ガイドブックの発行

吉田勝^{1,2}、ウプレティ^{1,2}、ライ²

¹ ゴンドワナ地質環境研究所

² トリブバン大学トリチャンドラキャンパス地質学教室 (ネパール)

Geology of the Everest region of eastern Nepal Himalaya: A newly published geo-excursion guidebook

*Masaru Yoshida^{1,2}, B.N. Upreti^{1,2}, S.M. Rai²

Gondwana Institute for Geology and Environment, Hashimoto, Japan¹

Department of Geology, Tri-Chandra Campus, Tribhuvan University, Kathmandu, Nepal²

**gondwana@gaia.eonet.ne.jp*

The Everest region occupies the northern margin of Indian Craton and is one of the best area to study tectonics of the Gondwanaland margins. The geology of the Everest region covering ca 100 km N-S with Mt. Everest (Sagarmatha) at the northern end and 30 km E-W along the Dudhkoshi Valley is composed of the Pale- to Meso-Proterozoic Lesser Himalayan Metasediments (LHM), Neoproterozoic Higher Himalayan Gneisses (HHG) and the Lower Paleozoic Tethys Sedimentary Sequence (TSS) from the south to the north.

Early Paleozoic granitic rocks occur extensively in the HHG and Tertiary leuco granitic bodies are intruding at around the boundary between HHG and TSS. The LHM is bounded with the HHG by the Main Central Thrust (MCT) with a southern vergence and the HHG is bounded with the TSS by the South Tibetan Detachment System (STDS, normal fault system gently dipping north).

The guidebook on geology and natural environment of this region published recently (Yoshida, et al., 2011a) forms one of the series publications of Himalayan guidebooks (Yoshida et al., 2011b). The book first gives introduction to the tectonics of the Himalaya, second describes on the general characteristics of geology and nature of this region based mostly on published bibliographies, and third, details of geology, geomorphology, natural hazards and vegetation to be observed in the field are given, based mostly on field observations by authors. New findings and ideas such as the evidence of early Paleozoic metamorphism (Yoshida et al., 2011c) as well as the correlation with the central and western Himalaya (e.g., Yoshida et al., 2008b; Yoshida and Upadhyay, 2009, 2010-2011) will contribute to the future studies of the Himalaya, which forms an integral part of marginal orogens of Gondwanaland. .

ネパールヒマラヤ東部のエベレスト地域は、インドクラトンの北縁に位置しており、ゴンドワナランド縁辺のテクトニクス研究に最適な地域のひとつである。

北端にエベレストが聳え、ドウドウコシ河に沿う南北約 100 km、東西約 30 km の本地域は、南から北に低ヒマラヤ帯、高ヒマラヤ帯、テチスヒマラヤ帯が分布し、主中央衝上断層と南チベットディタッチメント断層系が、それぞれの地質帯の境界をなしている。テチスヒマラヤ帯を構成するテチス層群は 8000m 峰の付近の稜線にのみ分布している。下位の高ヒマラヤ帯との境界付近付近には第三紀の花崗岩体が広く貫入している。

発表者らは 4 年間 200 人日余に及ぶ野外調査に文献調査を加えて、この地域の地学・自然環境野外研修ガイドブック (英文) を刊行した (Yoshida et al., 2011a)。本書は発表者らが進めているヒマラヤ地学・自然災害野外研修ガイドブックシリーズ (Upreti & Yoshida, 2005; Yoshida et al., 2008a, 2011b) の一部である。本ガイドブックは先第三紀地質、新生代地質、地形と氷河地質、自然災害、植物等々の分野を含み、自然環境学習者や地質研究者らの利用に供される。ガイドブックはヒマラヤのテクトニクス、エベレスト地域の地質概要と、主なトレッキングルートに沿う重要観察地点 173 点のカラー写真を添えた解説から成っている。本書は野外事実の紹介にとどまらず、中部や西部ヒマラヤにおける観察 (吉田ら, 2008b; 吉田・ウパジアイ, 2009, 2010-2011) との対比を含む新しい発見や見方なども示唆されている。

References

Upreti, B.N., Yoshida, M., 2005, Guidebook for Himalayan Trekkers, Ser. No. 1, Geology and Natural Hazards along the Kaligandaki Valley, Nepal.). Sp. Publication 2, Department of Geology Tri-Chandra Campus, Tribhuvan University, Nepal, 165 pages

Yoshida, M. et al. 2008a, Field excursion guidebook series on geology and natural hazards in Nepal Himalaya. In: Chigira, M. (Ed.), Proceedings of the International Conference on Management of Landslide Hazard in the Asia Pacific Region

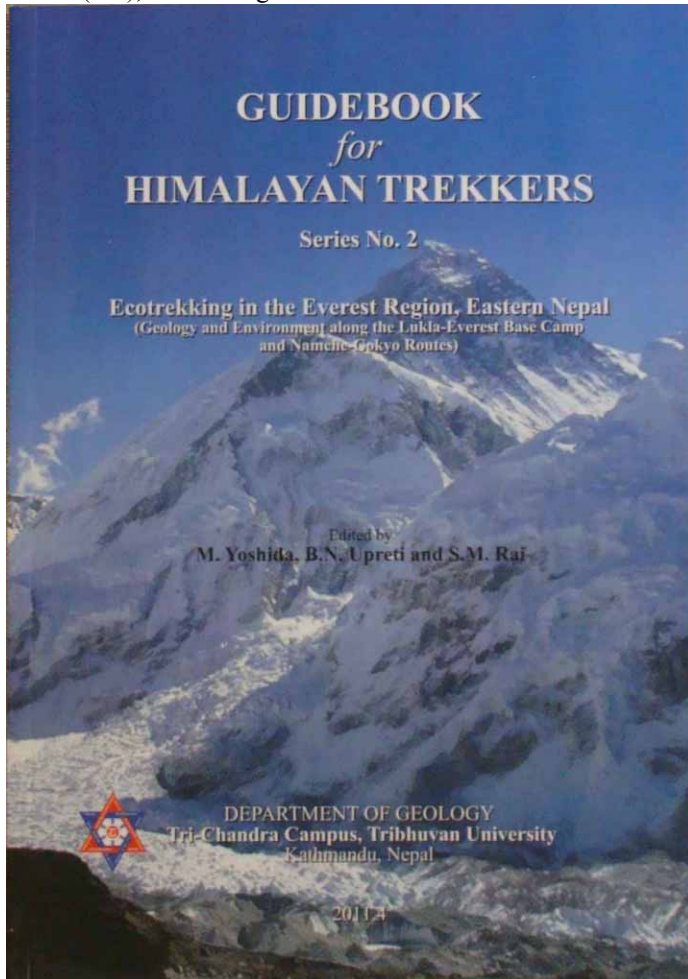


Fig. 1. Cover of the Geoguidebook of the Everest region.
L: Lukla, N: Namche Bazar, E: Everest Base Camp, G: Gokyo

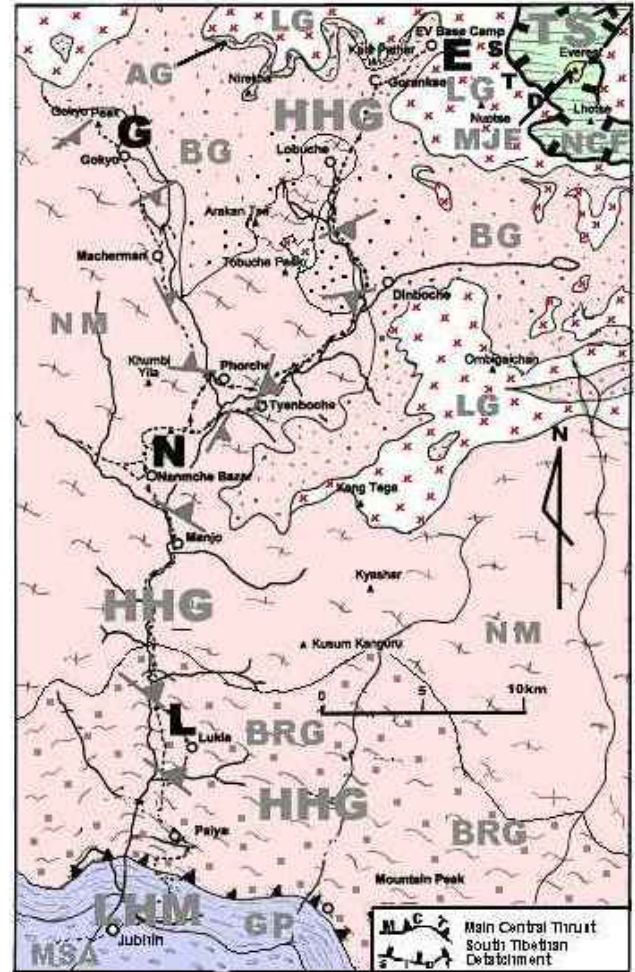


Fig. 2 Geologic map of the Everest Area
NWG, AGB, GPH, IKC: Lesser Himalayan Metasediments, BRG, NCM, RBF: Higher Himalayan Gneiss, NCF, MJF: Tethys Sedimentary Sequence, LG: Leucogranites.

Japan Landslide Society, Tokyo, 335-342.

Yoshida, M., Rai, S.M., and Upreti, B.N., 2008b, Geology and Natural Hazards along the Langtang Valley, Nepal Himalaya: Field Excursion Guidebook (In Japanese). *ネパールヒマラヤ・ランタン谷に沿う地学と自然災害—野外研修ガイドブック*. GRG/GIGE Misc. Pub., 19, Field Science Publishers, Hashimoto, 31 pages.

Yoshida, M. and Upadhyay, R., 2009, Geology and Scenery of Northwest Indian Himalaya: Field Excursion Guidebook (In Japanese). *北西インドヒマラヤの地質と風景—野外研修ガイドブック*. GRG/GIGE Misc. Pub., 20, Field Science Publishers, Hashimoto, 36 pages.

Yoshida, M., Upreti, B.N., Rai, S.M., 2011a, Guidebook for Himalayan Trekkers Series No. 2, Ecotrekking in the Everest Region, Eastern Nepal (Geology and Environment along the Lukla-Everest Base Camp and Namche-Gokyo Routes). Sp. Publication 3, Department of Geology Tri-Chandra Campus, Tribhuvan University, Nepal, 192 pages.

Yoshida, M., Upadhyay, R., 2010-2011, Geotraverse of Delhi-Leh route in Northwest Indian Himalaya, 1 and 2 (in Japanese), *Education and Movement in Geosciences*, 64, 51-60, 65, 17-26. *北西インドヒマラヤ「デリー～レールアウト」のジオトラバース (前・後)*. *地学教育と科学運動* 64号, 65号.

Yoshida, M., Upreti, B.N., Rai, S.M., 2011b, Himalayan Guidebook Series for Eco-trekking: Observing Geology and Nature in the Field. GRG/GIGE Misc. Publication No.24 (E-book, Amazon Kindle Store). Field Science Publishers, Hashimoto, 20 pages.

Yoshida, M., Gehrels, G.E., Upreti, B.N., Rai, S.M., 2011c, Early Paleozoic zircon ages from Namche Migmatites of the Higher Himalayan Zone (Abstract). 8th International Symp. Gondwana to Asia, August 26-28, 2011, Hyderabad. Abstract volume (IAGR Conf. Ser. 12), 52-53.