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Landslide distribution in Mangde-chu River basin, Kingdom of Bhutan

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There are many glacial lakes in the upper basin of the Mangde-chu River in Bhutan. Detection of landslide slopes is essential for a hazard assessment of glacial lake outburst floods (GLOFs) along the river because the occurrence of a GLOF may reactivate potential landslides by river bank erosion. The authors mapped the landslide distribution in the Mangde-chu basin using satellite images interpretation to determine the nature and distribution of the landslide phenomena in the area.

In this presentation, we report the results of the landslide distribution mapping as follows:

1) The detected landslides are topographically classified into types such as deep-seated type, shallow type, and rock-creep type.

2) Freshly glaciated valleys are formed above 4,100 m of riverbed elevation of the Mangde-chu River. Many shallow-type landslides (surface slope failure) are distributed on the valley slope. In addition, some moraines are dissected by small landslides such as slumps.

3) Many deep-seated-type and rock-creep-type landslides are distributed on the lower parts of the slope along the Mangde-chu River from 4,100 to 2,550 m of its riverbed elevation. The shapes of the glaciated valleys from 4,100 to 3,770 m riverbed elevation are preserved, but these shapes have been dissected by deep-seated-type and rock-creep-type landslides.

4) Large-scale rock-creep-type landslides are distributed on the upper and lower parts of the slopes along the Mangde-chu River from 2,500 to 2,100 m of its riverbed elevation. However, the distribution of deep-seated-type landslides is limited to the lower parts of the slope.

5) Large-scale deep-seated-type and rock-creep-type landslides are distributed widely on the upper and lower parts of the slope under 2,100 m of riverbed elevation of the Mangde-chu River. Most of the settlements and farmland along the Mangde-chu River are distributed on the landslide slopes of the deep-seated type.

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