

HDS022-02

Room: 201B

Time: May 26 11:00-11:15

Re-evaluation of potential of glacial lake outburst flood in the Himalayas

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Hazard of Glacial Lake Outburst Flood (GLOF) is an urgent environmental issue in the Himalayan countries such as Bhutan and Nepal. The GLOFs have frequently occurred since the 1960s, accompanied with shrinkage of glaciers and attendant expansion of glacial lakes. ICIMOD has reported that potentially dangerous glacial lakes existed 20 in Nepal and 24 in Bhutan. No obvious criteria, however, is not shown so far. In addition, some "real dangerous" glacial lakes, which have been pointed out by several field researchers, were not listed in the inventory.

We attempt to re-evaluate potential of dangerousness of GLOF by using ASTER digital elevation model. Relative angles of surrounding topography against a lake surface are calculated. By adopting a threshold of 10°, a place surrounding glacial lake, where field researchers have felt as dangerous, is successfully marked. We re-evaluate 44 dangerous glacial lakes in Bhutan and Nepal, and select some dangerous lakes which have never been pointed out. In addition, we also evaluate the threshold angle by assessing the pre-GLOF lakes by Hexagon KH-9 satellite images.

Keywords: Himalayas, Glacial lake, ASTER, Hexagon, DEM