

## Use of the Observation and MRI-GCM Data for Future Prediction of the Water Temperature in the Imja Glacier Lake, Nepal

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### Introduction

Expansion of glacier lakes in the Himalaya Mountains have reported by many researchers and it concerns GLOF (Glacier Lake Outburst Flood) due to filled water in the lake.

This study targets Imja glacier lake that is one of the largest glacier lakes in Nepal and it is well known as the potentially dangerous glacier lake of GLOF. This study aims to develop numerical simulation of the lake water temperature structure for understanding three dimensional water temperature structure of a glacier lake using the field investigation around Imja lake. And also simulate near future water temperature using MRI-GCM20.

### Data and method

3D-Hydrodynamic model “Imja-3D” computes for reproducing three dimensional water temperature structure in the Imja lake.

The authors collected air temperature wind speed, wind direction around Imja lake for model validation in October 2009 and in August – October 2011. Near future water structure simulation uses the MRI-GCM20 (2015-2020) output of temperature.

### Result

Fig. 1 and 2 shows model validation results, the computation result show similar water temperature structure in the lake.

The results of May and June in 2008 (Fig. 3 and 5) and the near future (Fig. 4 and 6) show that water temperature in near future increase earlier than water

temperature in 2008. The lake volume has been decreasing. These results indicate that the lake water in the future become more sensitive that resent caused by decreasing heat capacity due to the lake volume decreasing.

