Contribution ID: **15** Type: **oral**

# Impact of Climate Change on Glacial lake outburst (GLOF) in Northern Pakistan

*Friday 17 January 2025 13:20 (20 minutes)*

Northern Pakistan's glaciers, located in the Hindu Kush Himalayan region, are critical for sustaining South Asia's water resources and ecosystems. However, these glaciers are rapidly melting due to global warming, primarily driven by human activities such as fossil fuel combustion, deforestation, and industrial processes. Glacier melting, a significant effect of climate change, has increased the risk of Glacial Lake Outburst Floods (GLOFs) in northern Pakistan. The melting of glaciers in the Hindu Kush, Himalayas, and Karakoram mountains resulted in the formation of 3,044 glacial lakes, with 33 identified as highly vulnerable to GLOFs. Remote sensing and Geographic Information System (GIS) methods were used to map and analyse these risks.

Data on the size, volume, and depth of the lakes were analysed to develop equations estimating potential flood impacts. Hydrological models (HEC-RAS and HEC-GeoRAS), integrated with GIS tools, were applied to assess the extent and depth of flooding under different scenarios. The analysis showed that 20.56 km² of land was at risk of flooding, with 14.80 km² affected by Chitral-GL2 and 5.79 km² by Swat-GL31. Flood depths ranged from less than 5 meters to over 15 meters, impacting 2.7 km² of built-up and agricultural land and 8.93 km² of barren land.

These findings emphasized the urgent need for strategies to manage and reduce the risks of GLOFs, which threaten communities, farmland, and infrastructure in northern Pakistan.

**Author:** MIR, Rabia (University of Bayreuth)

**Presenter:** MIR, Rabia (University of Bayreuth)

**Session Classification:** Air

**Track Classification:** Air