

Biography: Masaki Hayashi, Ph.D., is a professor in the Department of Geoscience at the University of Calgary. He received his B.Sc. and MSc. in earth sciences from Waseda University and Chiba University, respectively, in Japan and his Ph.D. in earth sciences from the University of Waterloo in Canada. His main research interests are in the connection among groundwater, surface water, and atmospheric moisture in various environments ranging from the prairies to the mountains.

Title: Alpine hydrogeology: The critical role of groundwater in sourcing the headwaters of the world

Abstract: Many of us have been awed by the stunningly beautiful view of alpine lakes and streams – and they are not just beautiful. Nearly half of the world population relies on rivers originating in high mountains for water supply. Source areas of mountain streams have rugged topography with sparse soil and vegetation covers, and were once considered “Teflon basins” that have minimum capacity to store groundwater. Over the past decade or so, a new understanding of alpine hydrogeology has been emerging based on detailed field observations around the world. Alpine basins actually have important aquifer units that provide temporary storage of rain and melt waters from snowpack and glaciers. Gradual release of water from these aquifers sustains stream flow during dry or cold periods, and is critically important for water supply and aquatic habitats in downstream regions. Due to rugged terrain and severely limited vehicle access, alpine hydrogeologists need to rely on creative methods to investigate groundwater, such as geophysical imaging techniques or observation of surface-groundwater interaction. This lecture will demonstrate how we can gain valuable insights into groundwater in challenging environments and develop conceptual understanding of hydrological systems. These ideas and approaches will have broad applicability in a variety of environments, where hydrogeologists are faced with challenging conditions.

