

Future projection of glacier melt and its impact to downward river discharge by a global glacier model HYOGA

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Projecting melt water from glacier and ice caps under the changing climate is important factor for projecting future water resources in glacier-fed river basins and future sea level rise. When glacier retreats under the warming climate, base flow of river discharge is expected to be once increased and then suddenly disappeared at small glaciers located in relatively low altitude, while large glaciers located at high altitude balance at new stable condition of the warming climate and survive for the next centuries. With a global glacier model HYOGA accounting area change along altitude associated with retreat and advance of glacier, we modeled future evolution of glacier volume and its impact on downward river discharge at global scale. Although HYOGA model could replicate mean balance and rapid increase of glacier melt at continental to regional scale, its spatial and temporal variation is high in different glaciers. This difference also affects when low flow turns to increase trend to decrease trend associated with disappearance of glaciers. Future projection of glacier melt driven with A1B scenarios by 5 GCMs showed that in many part of the world glacier retreats significantly, while its timing and speed varies among different GCM experiments.