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Searching the elusive optimum in the glacier compensation effect

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Glaciers are known for their role as water resources and moderators of streamflow. This latter role is also known as the glacier compensation effect. In glacierized catchments, the glacierized part and the non-glacierized part correlate negatively with respect to streamflow. During warm and dry conditions, streamflow is favoured from the glacierized part of the catchment, and opposite, during cold and wet conditions, streamflow is generated mainly in the non-glacierized part of the catchment. This effect thus buffers precipitation variability and causes a reduction in streamflow variability, since both conditions do not occur at the same time. Moreover, theory and literature suggest that this effect depends on the relative glacier cover. Plotting inter-annual variability against relative glacier cover should give a curve with a minimum variability for moderate glacier covers. At both ends of the curve, either precipitation or radiation variability dominates the signal, causing a higher streamflow variability. This curve has been shown for a few regions in some studies, with "optimum" glacier covers around 30-40%. However, testing this effect with recent data and finding an optimum glacier cover for which streamflow variability is lowest, revealed no clear results. The analyses seem to be challenging due to e.g. data scarcity for catchments with high glacier covers, the use of different time periods for streamflow observations and glacier changes. So, is the glacier compensation and streamflow variability theory as straightforward as we think?