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## Understanding monsoon controls on the energy- and mass-balance of glaciers in High Mountain Asia

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The Indian Summer Monsoon (ISM) shapes the melt and accumulation patterns of glaciers in large parts of High Mountain Asia (HMA) in complex ways due to the interaction of persistent cloud-cover, large temperature amplitudes, high atmospheric water content and high precipitation rates. While the ISM dominates in the southern and eastern regions, it progressively loses influence westward towards the Karakoram, where the influence of westerlies is predominant. Previous applications of energy- and mass-balance models for glaciers in HMA have been limited to single study sites (in Khumbu, Langtang and Parlung) and a few attempted to link model results to large-scale weather patterns. While these studies have helped to understand the energy- and mass-balance of glaciers in HMA under specific local climates, a regional perspective is still missing. In this study, we use a full energy- and mass-balance model together with eight on-glacier AWS datasets around HMA to investigate how ISM conditions influence glacier-surface energy and mass balance. In particular, we look at how debris-covered and debris-free glaciers respond differently to the ISM, validating our results against independent in-situ measurements. This work is fundamental to the development of parameterizations of glacier melt for long-term hydrological studies and to the understanding of the present and future HMA cryosphere and water budget evolution.