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Seaonalities of glacier changes on the polythermal glaciers, Nyainqêntanglha Range

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The climatic variables are supposed to be the influential factors for the summer accumulation type glaciers in the Nyainqêntanglha Range, Tibetan Plateau. There are certainly unique regional climate regimes within this area during different seasons. In the summer season, the prevailing regional climate is controlled by a plenty of moisture transported by the warm summer monsoons, while it is getting colder and drier by the westerlies from the inland of Eurasia in the winter season. The impact of the resultant local hydro-thermal condition fluctuation on the the glacier dynamics is still not well understood. In this study, the seasonal patterns of glacier behaviors are estimated in terms of glacier surface displacements under a certain climatological state (2006-2009). The glacier surface displacements are derived from Landsat imageries by using the feature tracking method. The land surface temperatures and precipitations are selected as the representative parameters of the regional climate in the Nyainqêntanglha Range. According to the tendency analysis, the apparent annual cycle of precipitation and land surface temperature are recognized. At the same time, the diurnal change of land surface temperature (>0°C mostly in the daytime, <0°C mostly in the nighttime) is found as well. As the main input of glacier mass balance, the precipitation (both solid and liquid forms) experiences the oscillations combined with a slightly decreasing/increasing trend during the summer/winter seasons. Furthermore, the spatial distributions and seasonal patterns of the glaciers surface displacements and their anomalies are assessed as well. On the spatial scale, the active surface displacements are detected not only in the lower elevated area (ablation zone) but also in the higher elevated area (accumulation zone). On the time scale, there are more larger displacements measured in the summer season than the winter season. It implies that the glacier surface displacements in the summer season seems to be more associated with regional thermal conditions.