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Characteristics of Continental Glacier Surge in NE-Pamir

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In May 2015, It is reported that "a glacier slid 20 km long, accompanying with disappearance of $\sim 10 \text{ km}^2$ grasslands, on the north slope of Mt Jiubie, Kungur Mountain, Northeastern Pamir, China". Based on expedition and multi-temporal RS image interpretation, this paper confirm that it was a rare continental valley glacier surge[1] took place in the tributaries of Kalayayilake Glacier, and find : (1) It has significant phenomena difference between quiescent and surging phase, including distorted medial moraine ridge, extruding-bulging ice masses, disappeared superglacial lakes etc; (2) Compared with oceanic glacier surge, its characteristics are relative high ice choking uplift, large chaotic crevasses interval area extent and centennial-scale repetition, but small integral movement distance and low velocity; (3) Environmental factors of large glacier coefficient, long tongue, low altitude, especially the stagnant downstream tongue and thick superglacial moraine thick, contribute to continental glacier surge's features, and the long-term temperature rise and rainfall enhancement in study area seem to coincide surge occurrence; (4) This surge brings out severe strength reduction of glacier, rapid ablation of ice, congestion in the subglacial passageway, and accumulation of englacial water, which together have being bred the risk of terminus advance suddenly to result in flooding and debris flow.

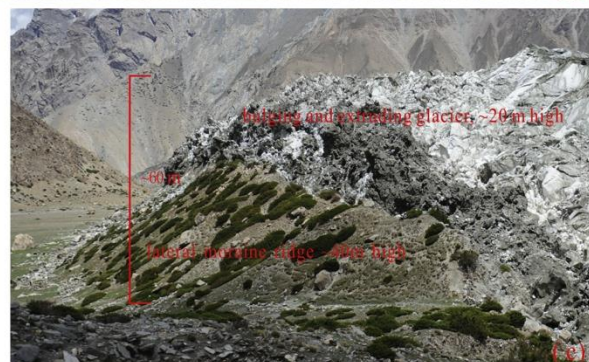


Figure 1: Characteristics of debris-covered Glacier Surge

(a) Terminus of glacier, ice mass extruded, uplifted, rushed through the overlying debris, formed chaotic crevasses, reflected the causation of grasslands disappearance. (b) Midstream of glacier, ice mass uplift and spilled out about 10 m above the 40-m-high lateral moraine ridge. (c) Transverse section photo of upper midstream, glacier body expand, fractured, wavy lifted, and extruded to overlapped the ~20-m-high lateral moraine ridge.

References:

[1] Meier M and Post A (1969) Canadian Journal of Earth Science 6(4): 807-817

