

Interactive comment on “A Close Observation to a Typical Continental Valley Glacier Surge in Northeastern Pamir” by X. Yao et al.

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Received and published: 15 June 2016

Dear Anonymous Referee #2

Thanks very much for your detailed and sincerely comments on this paper, especially given some specific reference information, to improve this manuscript (tc-2015-235). During the discussion period, authors have done new studies and used new data to promote the paper. A new in-situ investigations on Aug. 2015, additional 5 ETM RS images interpretation updated to 2016-06-02, 1 high-resolution RS images interpretation on 2015-12-18, 9 consecutive phases Synthetic Aperture Radar (SAR) offset-tracking survey from 2015-02-28 to 2016-04-11, were carried out to determine the initiate time, process, deformation characteristics, velocity, duration of this surge. Thus, some detailed finds and deep understands have been gained: (1) This surge experienced about

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300 days, initiated in Feb., 2015, fully fractured in the spring and early summer, declined after Aug., and recovered to normal status after Oct., 2015; (2) The peak surge velocity wavy transfers from upstream to downstream with 8-10 m/day during initiation period, and propagation of surface cracks was up to 58.3 m/day, resulted in fracturing of 3.5-km-length tongues of tributary(a) and (b), then peak velocity descended from ~ 10 m/day to ~ 1 m/day in remainder time, which almost made the entire trunk disturbed with anti-press longitudinal crevasses; (3) The height of "receiving" area increased 20~40 m with $2.7\text{-}3.6 \times 10^8$ m³ ice transferred from "reservoir", and accumulation time of this volume maybe need half to one centennial in quiescent period; (4) Environmental factors of large glacier coefficient, long tongue, low altitude, especially the stagnant downstream tongue and thick superglacial moraine, contribute to its features; (5) Nevertheless, long-period increase of precipitation and temperature, while a short, local fluctuation in NE-Pamir were favorable for the occurrence, the characteristics of surging indicates that this surge initiation controlled by hydrological instability directly; (6) This surge made internal advance and trunk disturbance, but no effect down to the terminus, therefore, there would be no disasters to downstream. Above conclusions maybe have answered some your suggestions, other are not covered, we will try to complete in the next few days. As you mentioned the transfer volume calculation is difficult during surge, but we attempt give a qualitative result according to the field survey, in order to provide more information for reader, despite it is not very accurate. For the figures, we have modified the labels and size for easily read. We will standardize terminology according to some references. Thanks for patient revision to some little errors, amendment line by line will be made by authors.

Interactive comment on The Cryosphere Discuss., doi:10.5194/tc-2015-235, 2016.

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