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Debris cover growth, ensuing changes in morphology and impact on glacier processes at Pensilungpa Glacier, western Himalaya, India

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Presented by

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## Objective, Study area and Datasets

#### **Objectives**

(i) Multiparametric study of the Pensilungpa glacier to comprehensively assess its response to climate change.

(ii) Understanding influence of the debris cover on overall glacier health.

(STUDY PERIOD: 1993-2017)

**Datasets** 

- (i) Field data: 2016-2018
- (ii) SRTM: 2000

(iii) ASTER:2017

(iv) Landsat: 1993-2017



Pensilungpa glacier, Zanskar range, western Himalaya (14.67 km<sup>2</sup>)



# **G**<sup>•</sup> Field operation (2016-2018)



Debris cover characteristics on Pensilungpa glacier



**Steam-drill operation on Pensilungpa glacier** 

## Concerning Results



Area Change (%/y)





Slowdown (%/y)

20 10 0 -10 1993-2000 2000-2017

Debris cover (%/y)





#### **Debris cover influence**





# © Ice-cliff evolution (2013-2017)



## Major inferences

- (i) Glacier has depleted over the study period; magnitude of wastage was higher during previous decade.
- (ii) Debris changes was in sync with glacier depletion.
- (iii) Debris cover retards meting as a function of its thickness, debris gets thinner upwards from snout, consequently higher downwasting observed upglacier.
- (iv) Differential melting led to slope inversion which coupled with slowdown caused stagnation of lower ablation zone.
- (v) Stagnation of the LAZ has caused bulging in the dynamically active upper ablation zone and favored the development of supraglacial lakes and ice-cliffs.
  (vi) In view of insulated margins, back-wasting of ice-cliffs dominates the ablation process on the glacier.