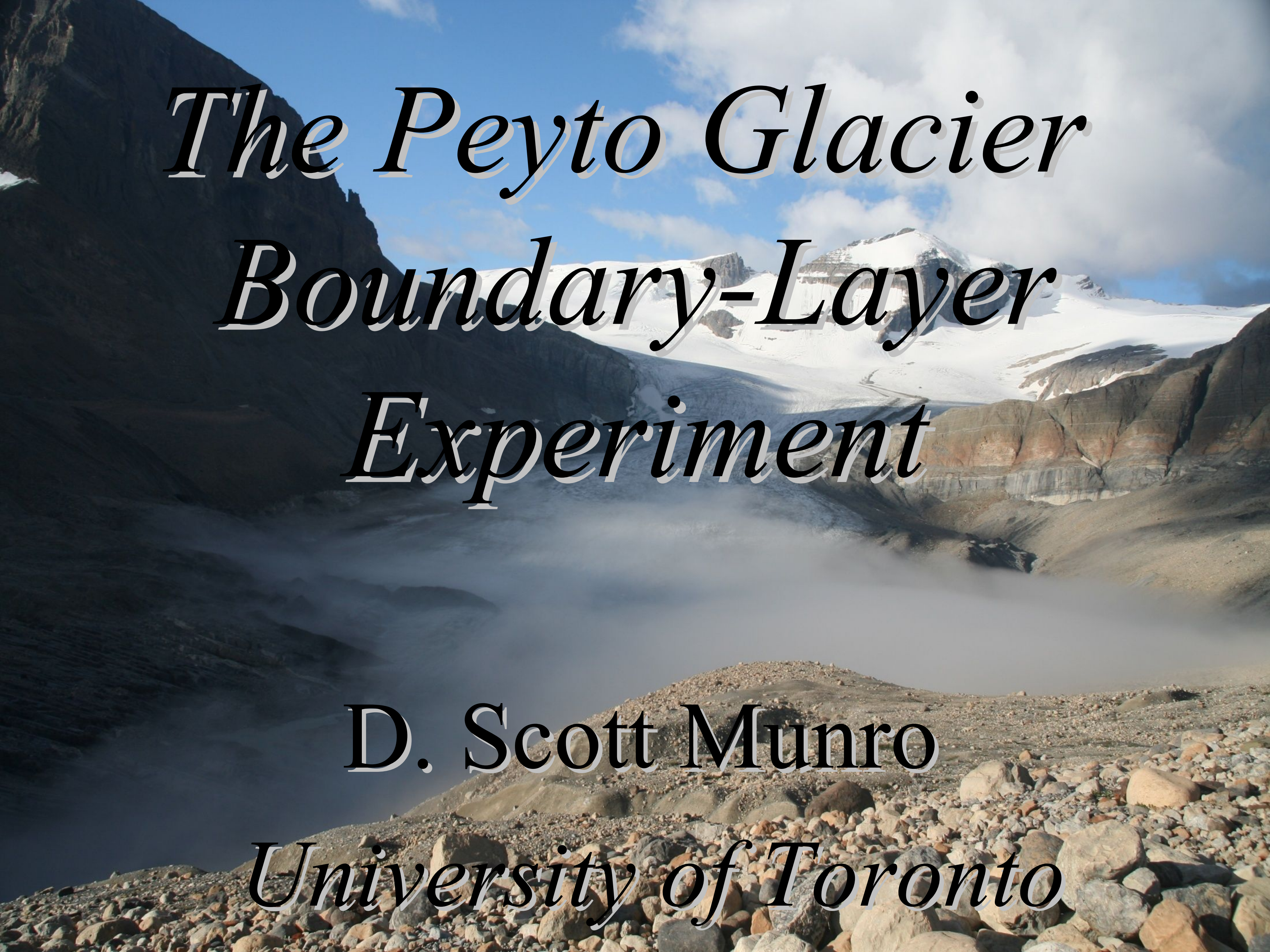
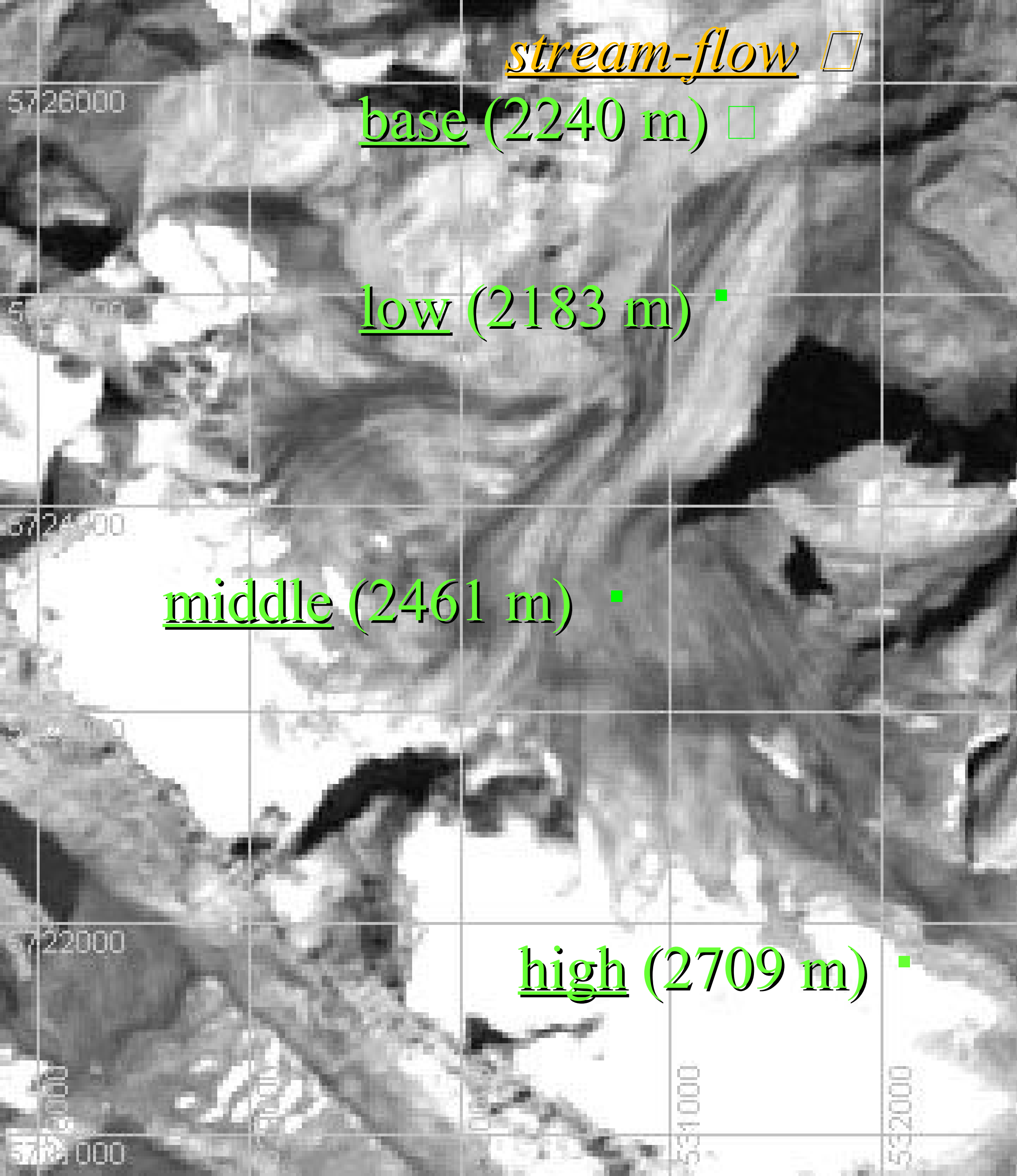


The Peyto Glacier Boundary-Layer Experiment

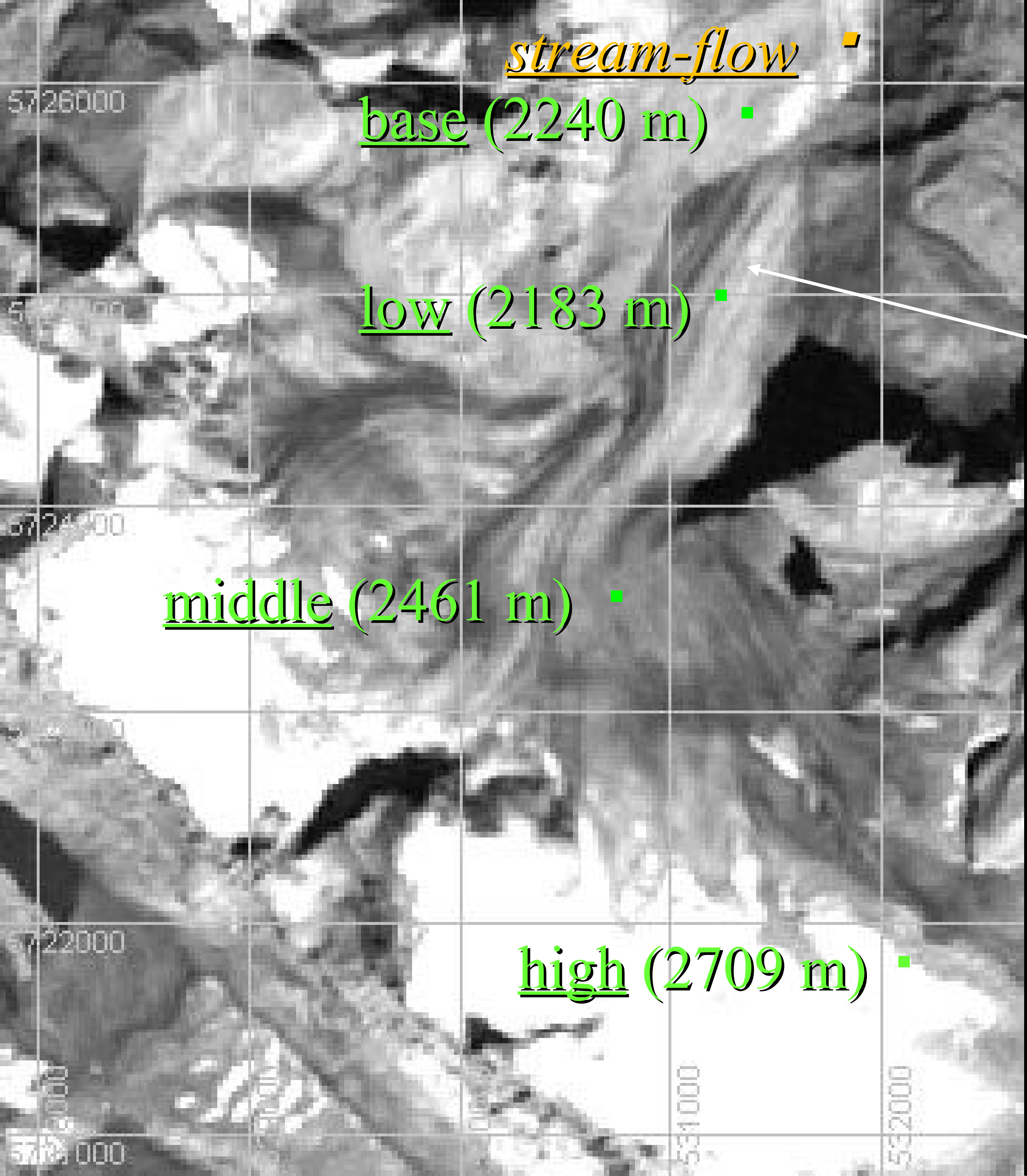
D. Scott Munro

University of Toronto



AWS Status

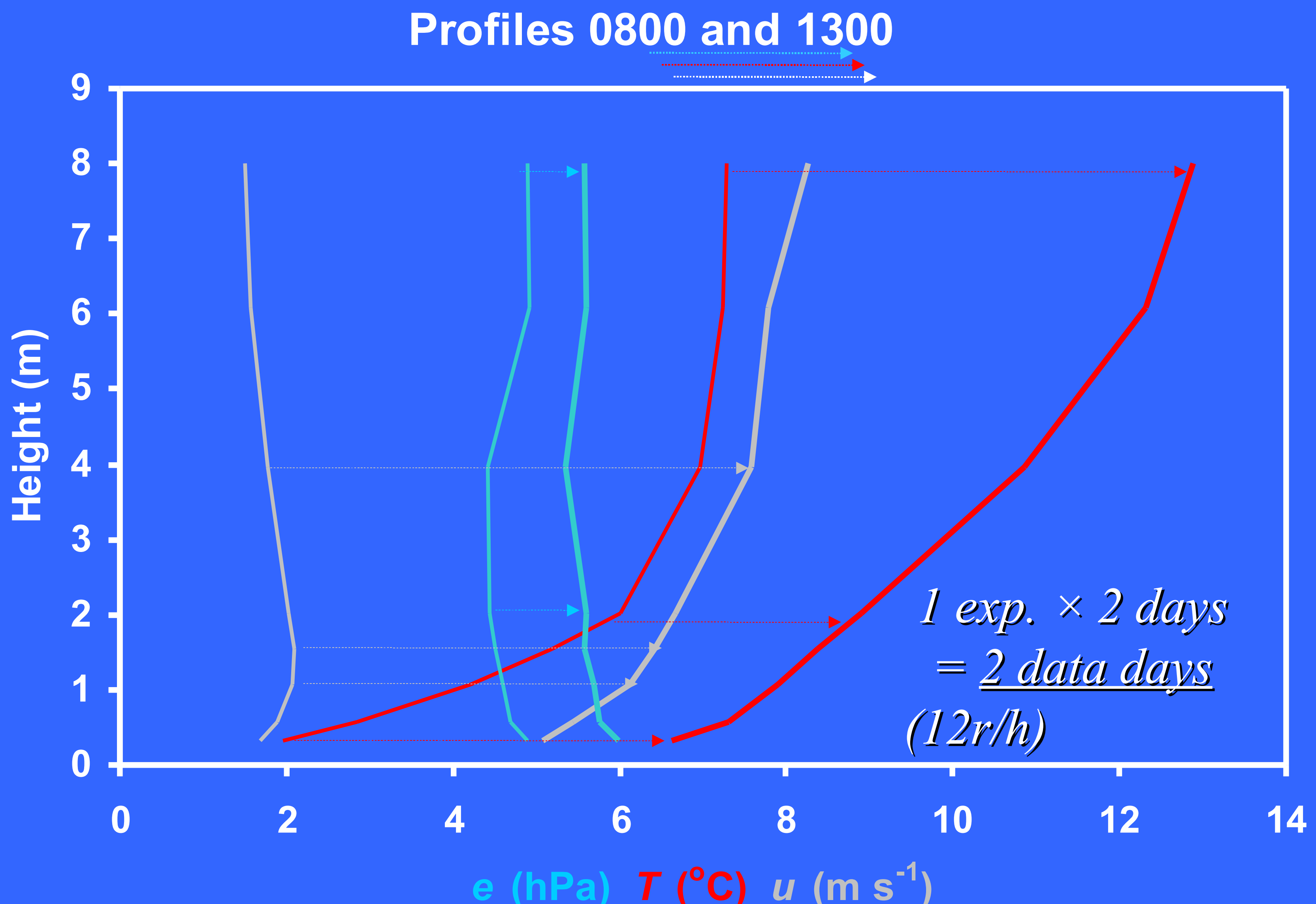
- Point *process* investigation
- Spatial distribution tools (DEM, trigonometry, *parameterization*)
- Distributed modelling and *prediction*
- Base AWS/RCM forcing



AWS Status

- Point *process* investigation

August 2007 Profiles



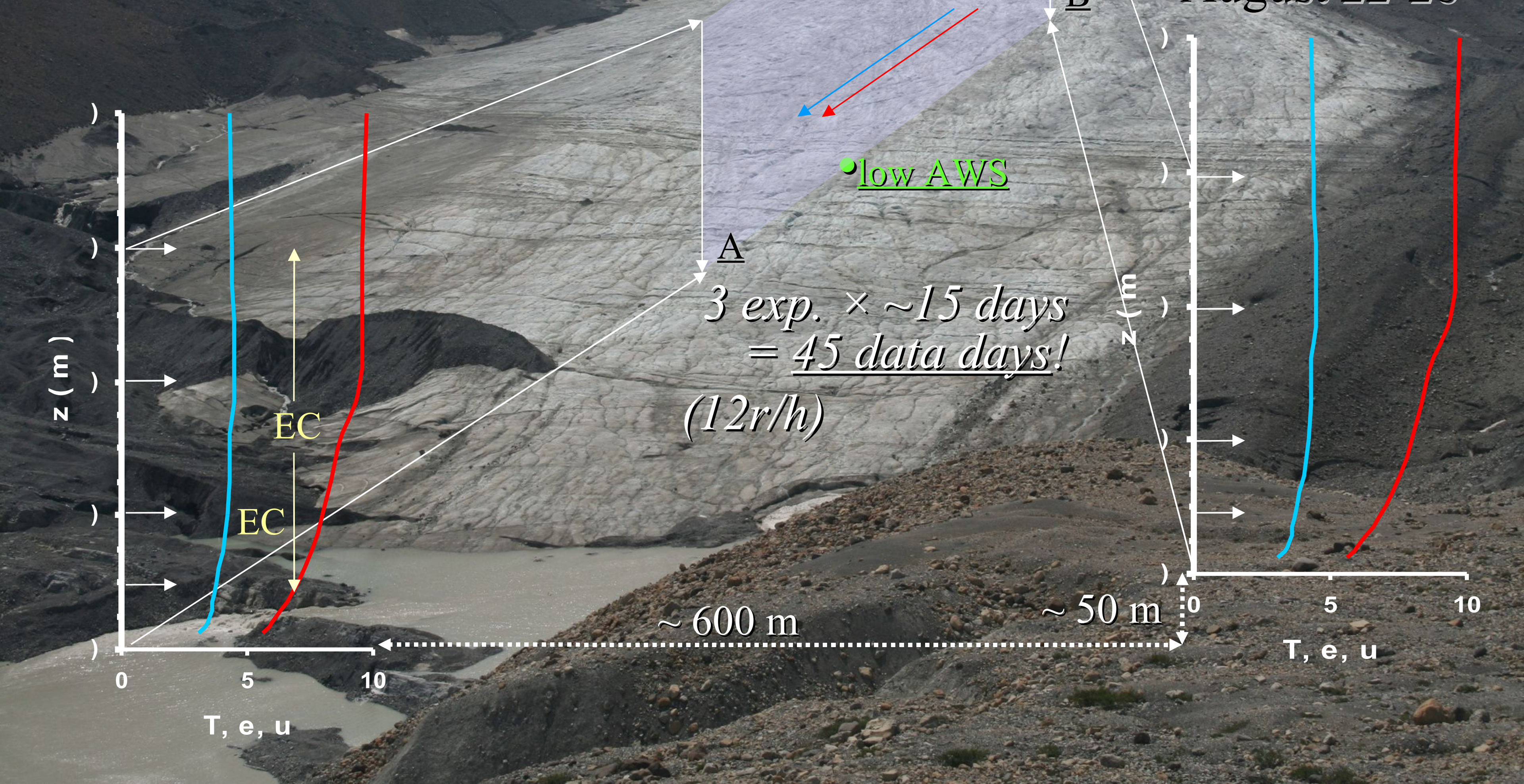
Twin profile experiment:

B: energy → ablation → runoff suite

B to A: B-L acceleration & cooling

A: 10 Hz B-L turbulence (*BLHFs?*)

- July 24-26
- August 4-8
- August 12-17
- August 22-28



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- August 22-28

B

A

low AWS

3 exp. × ~15 days = 45 data days!

(12r/h)

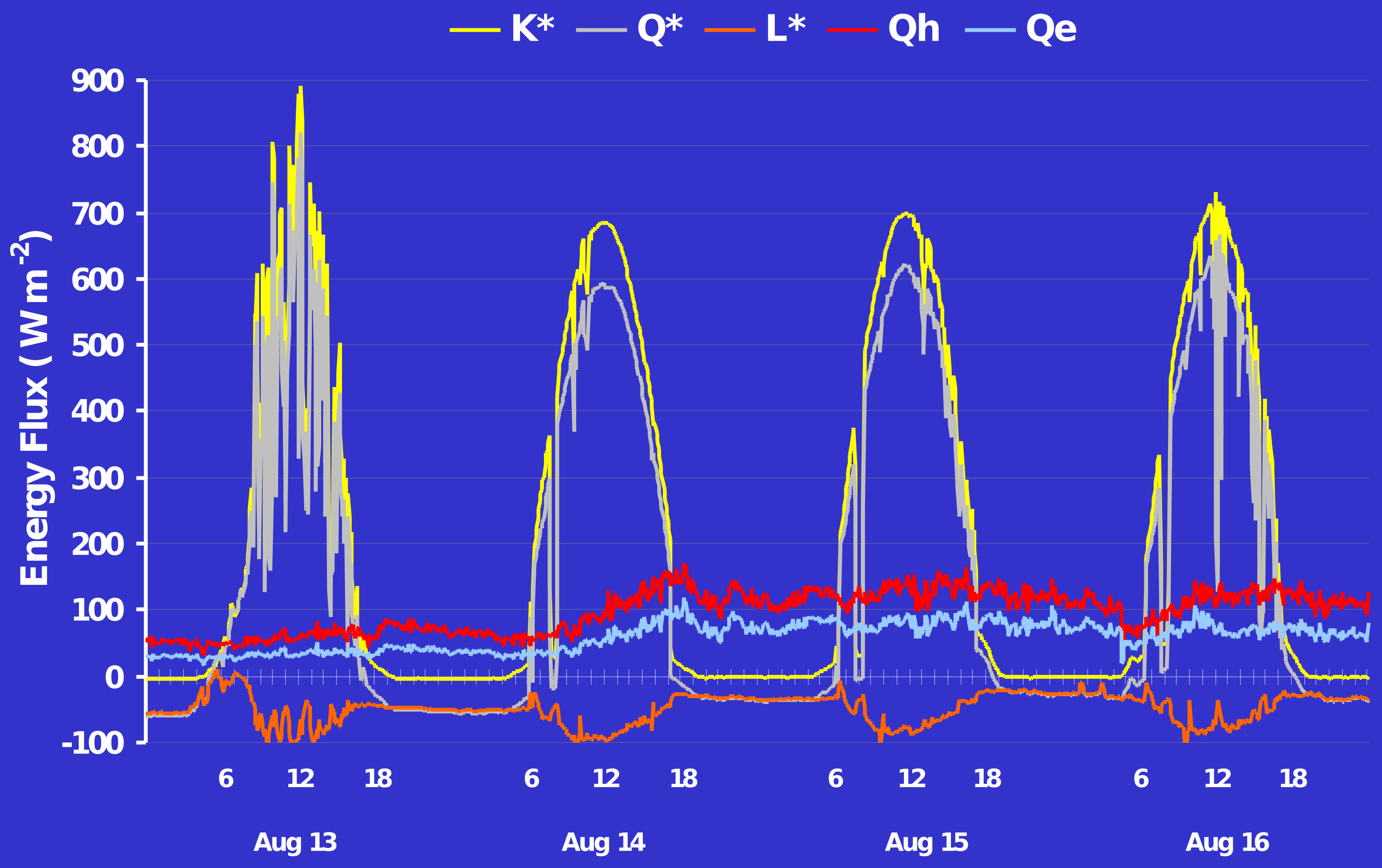
~ 600 m

A: profiles & 2EC

also, hydrology!

B: profiles, EB terms & ablation

B: energy → ablation → runoff suite



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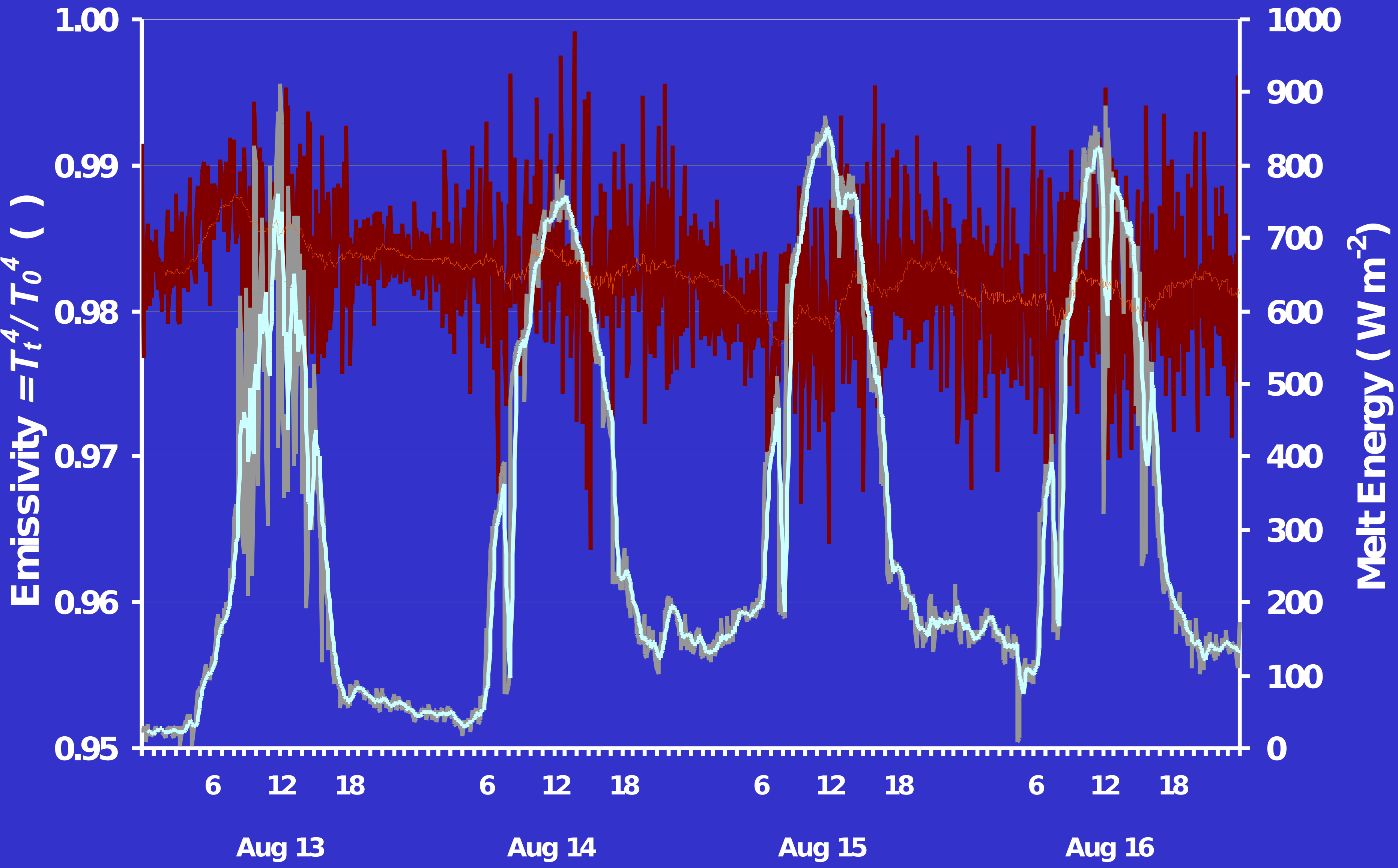

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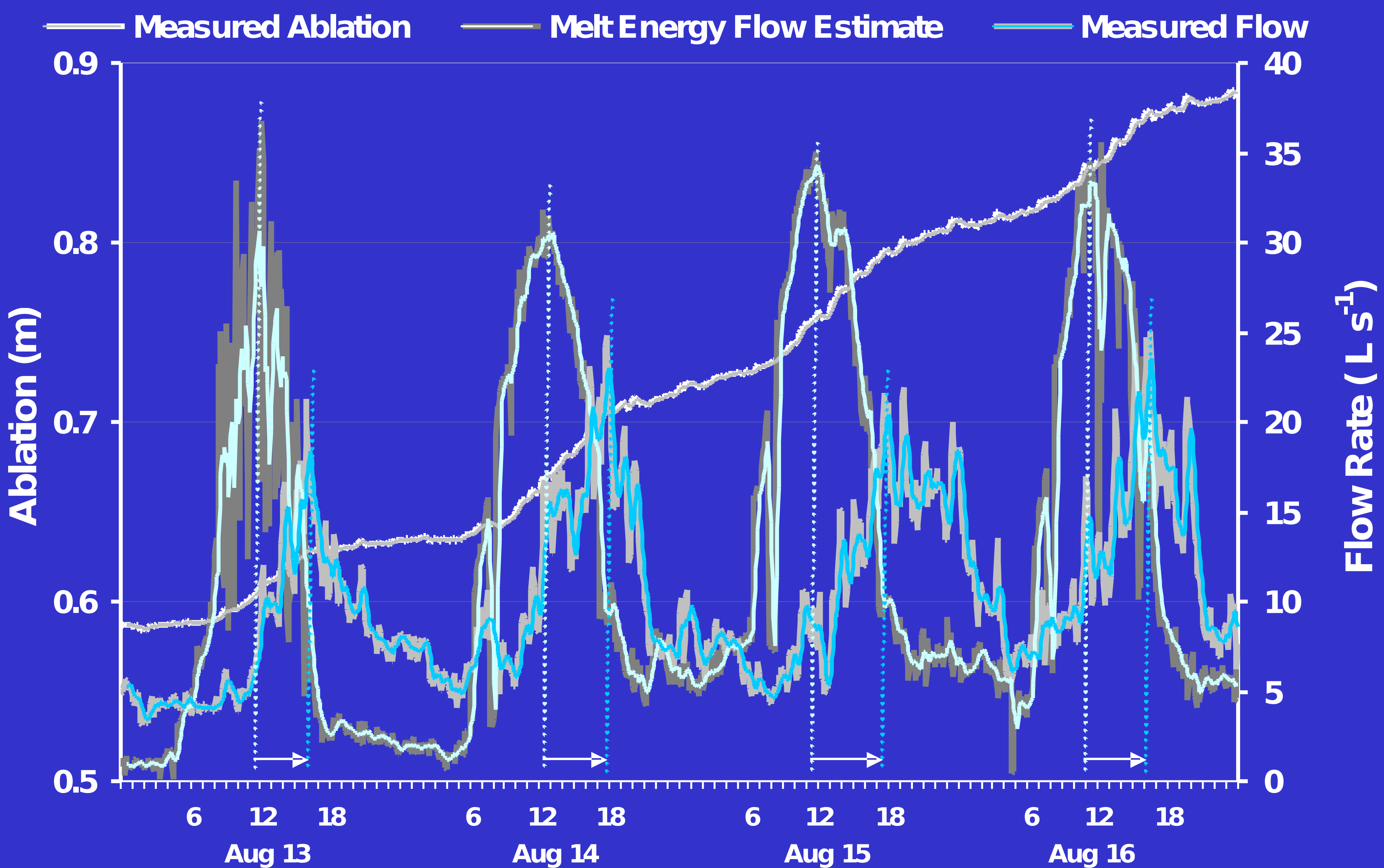
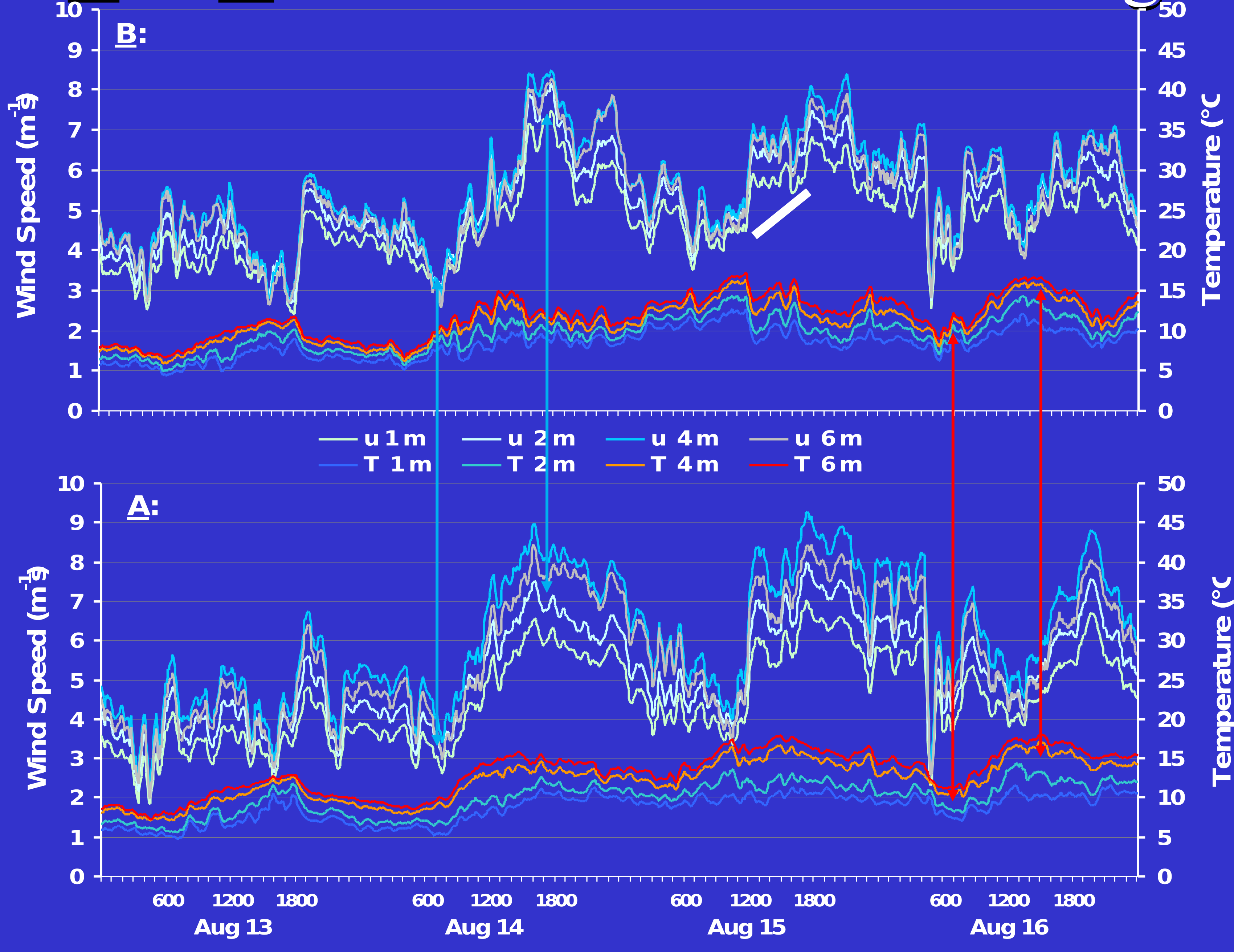
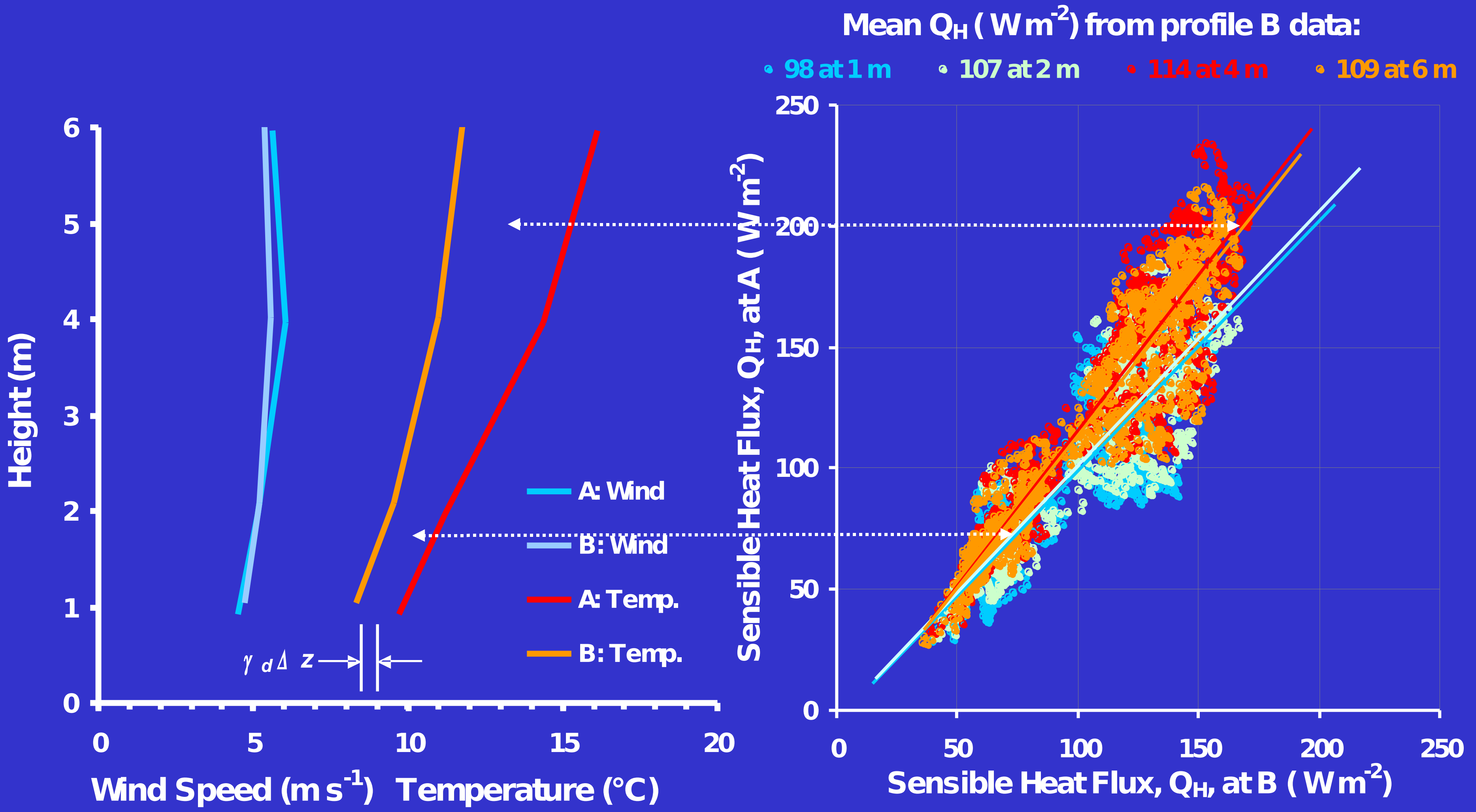


B to A: B-L acceleration & cooling



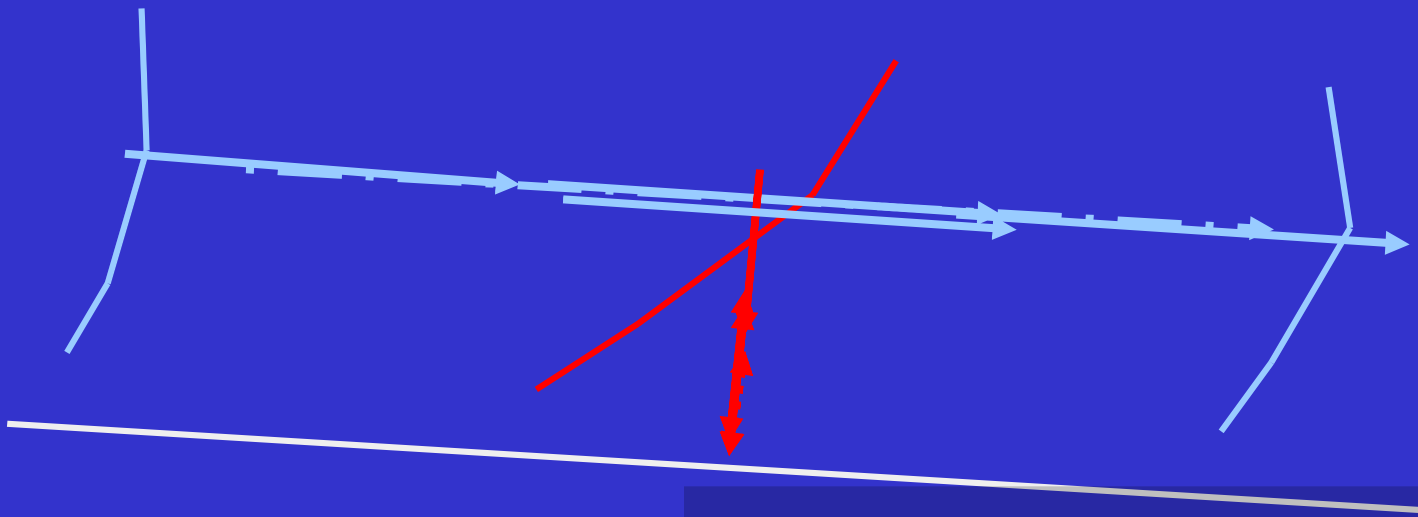
B to A: B-L acceleration & cooling



Taking mean values, assuming no heat transfer across 4 m and correcting for adiabatic warming, expect 1 & 2 m $T_A < T_B$ by ~2 °C.

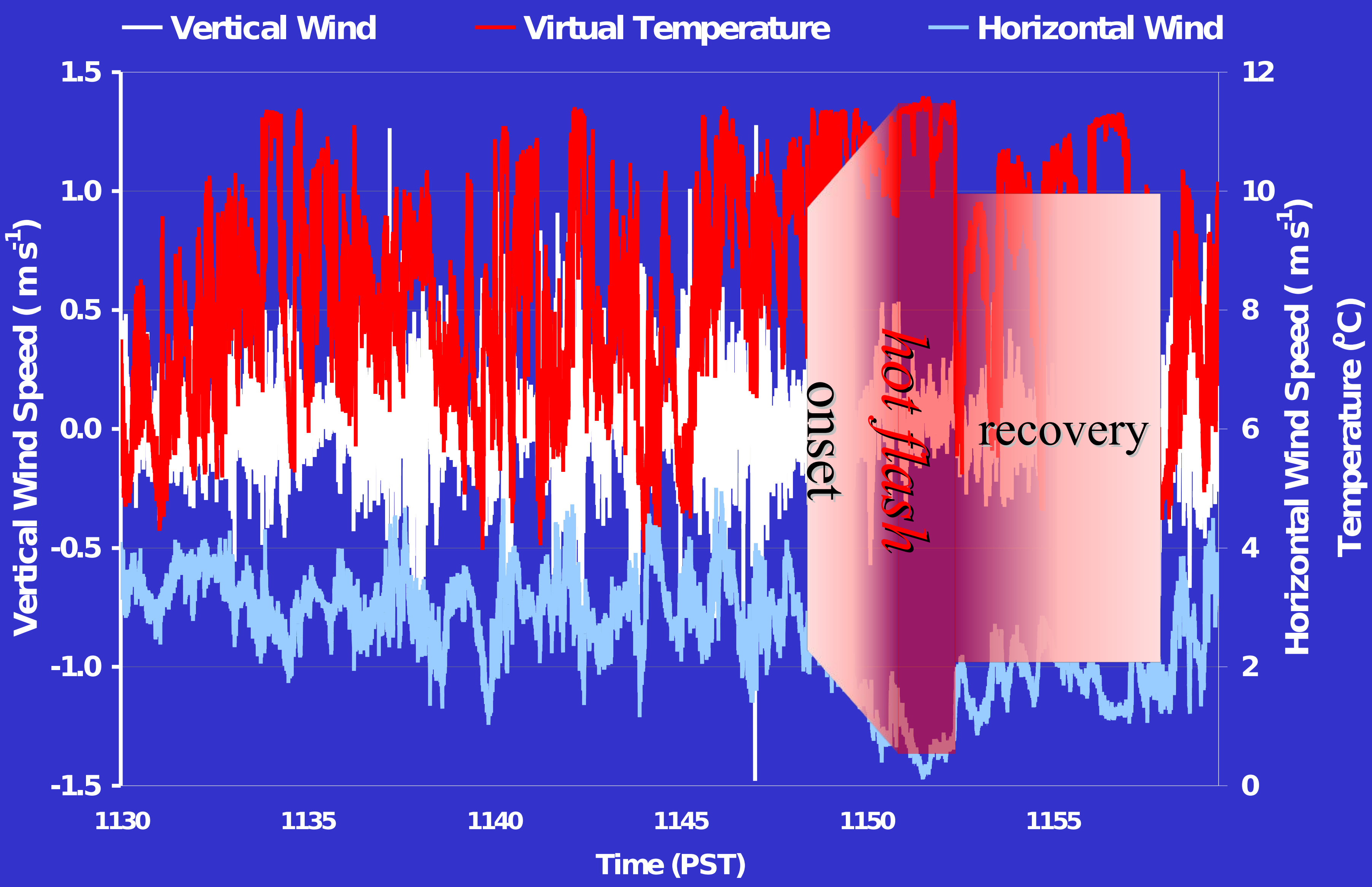
A: 10 Hz B-L turbulence (*BLHFs?*)

Def'n: A glacier *boundary-layer hot flash* (BLHF) is very brief warm spell that coincides with a lull in the glacier wind (*Munropedia*).



BLHF frequency: greater at A than at B?

A: 10 Hz B-L turbulence (*BLHFs?*)



Χ ο ν χ λ υ δ ι ν γ Ρ ε μ α ρ κ σ

Findings to this point:

- B: $T_s < 0$ °C is consistent with ~0.98 surface emissivity
- B: significant lag in supra-glacial run-off
- B→A: minimal acceleration; significant warming
- B→A: similar sensible heat flux values below 4 m
- A: boundary-layer flow instability (*i.e. BLHFs*)

To do:

- explanation of B→A sensible heat flux similarity
- search for vertical eddy flux divergence
- comparison of EC and bulk transfer eddy fluxes
- etc.

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