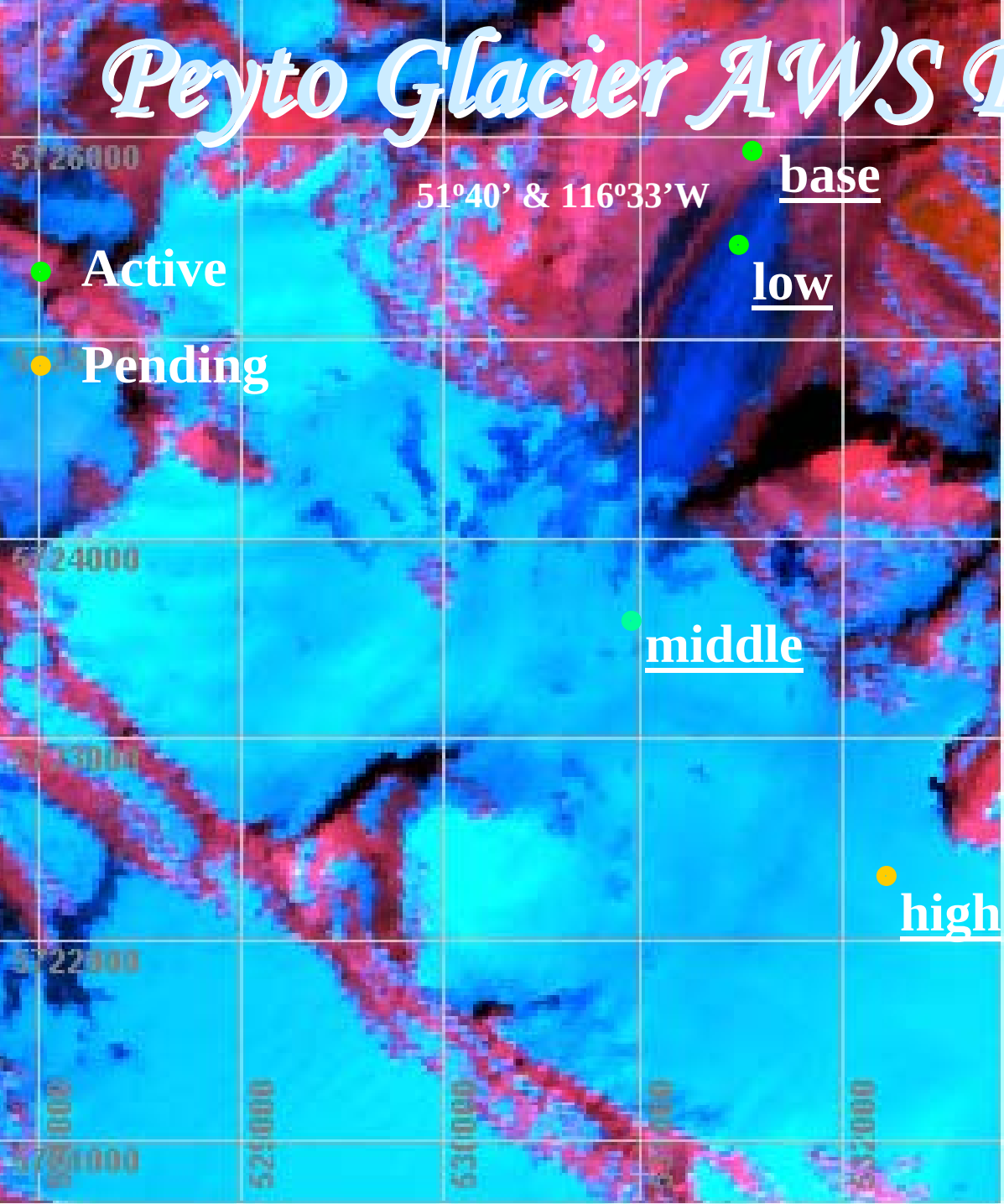
Researching Peyto in the Context of a 25 m HRU.

D. Scott Munro

University of Toronto

Peyto Glacier AWS Deployment.



Research Associates External to IP3:

M.N. Demuth, NRCan

– CSA Grip Land Ice Project.

R.D. Moore, UBC

– WC2N Place Glacier component.

AWS Program Scheme

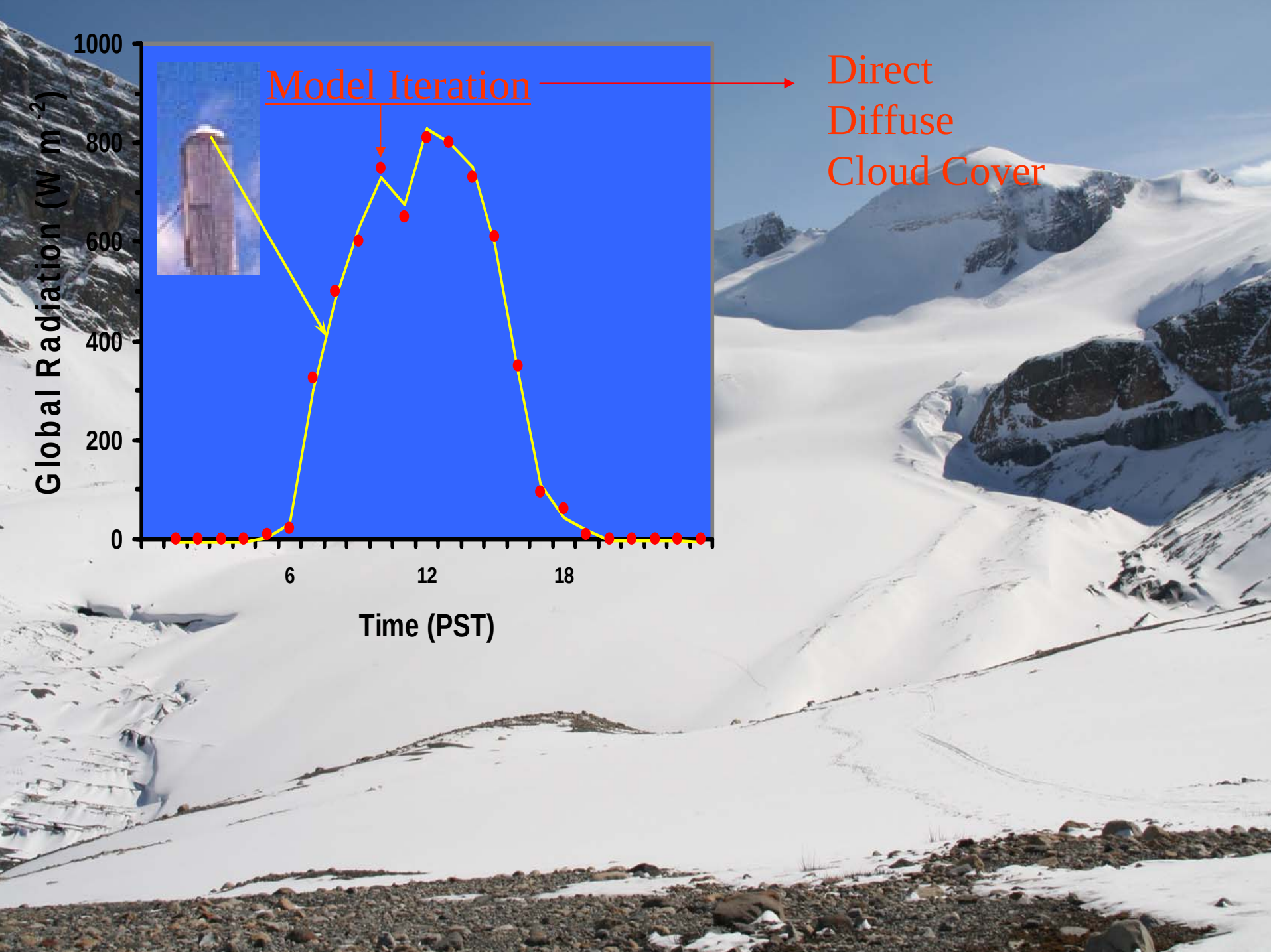
1) Off-glacier: base stations

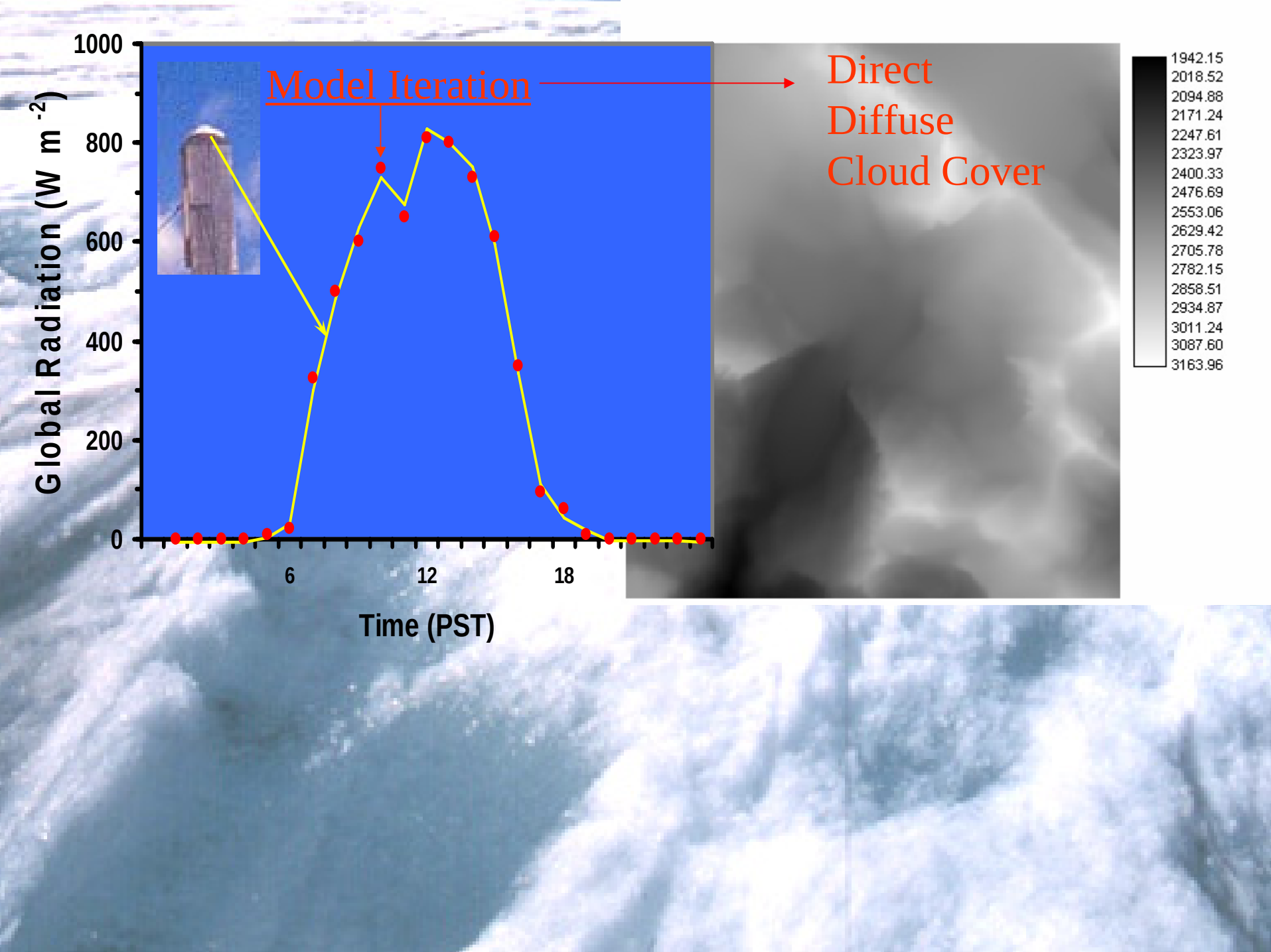
- background data for trends and regional context
- driving variables for spatial and temporal modelling

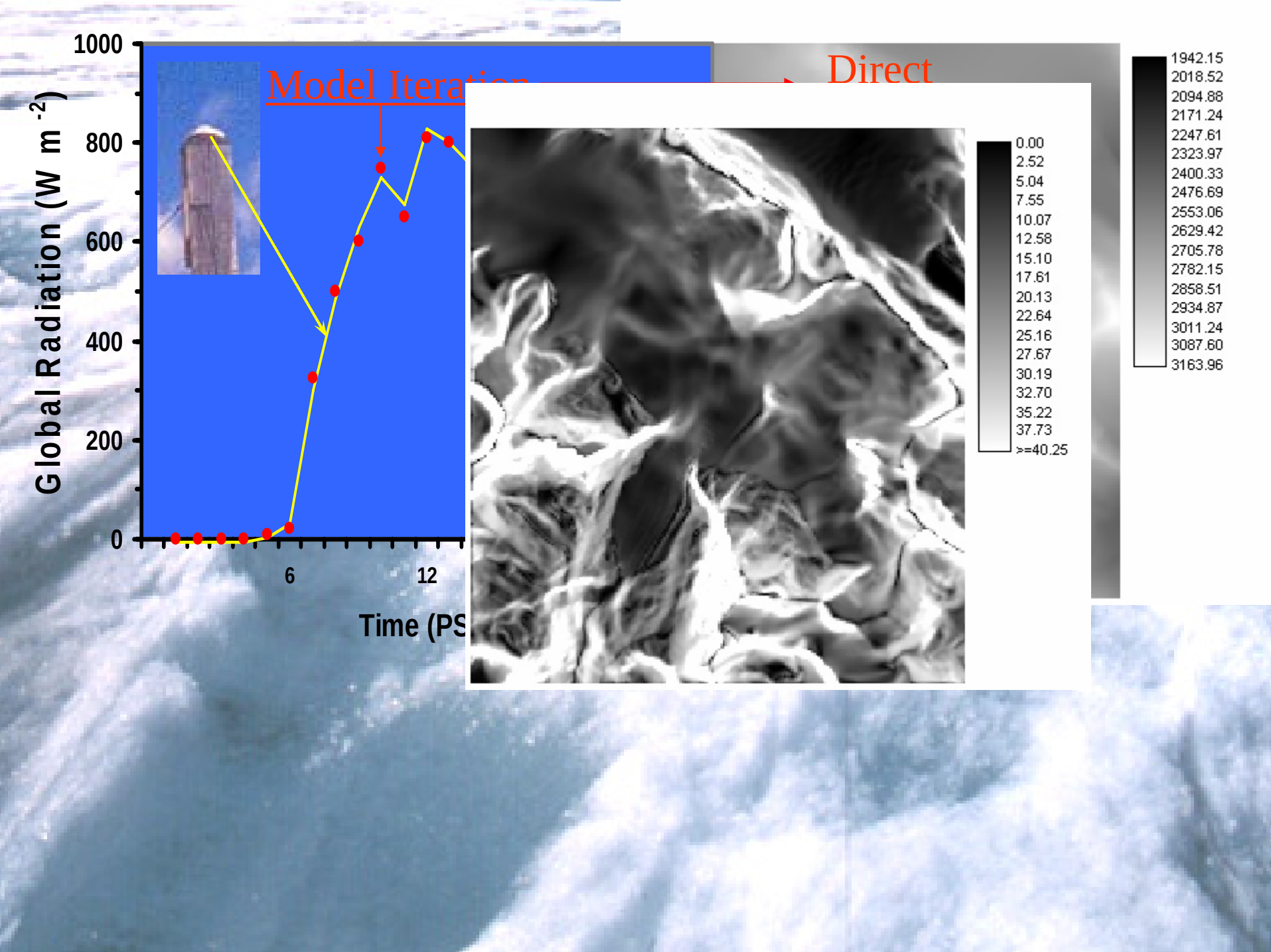
2) On-glacier: ice/snow stations

- focus sites for ablation/accumulation process work
- spatial/temporal description and model validation data

AWS Program Scheme


Model Iteration
Direct
Diffuse
Cloud Cover
Global Radiation (W m-2)
1000
800
600
400
200
0
6
12
18
Time (PST)


Model Iteration
Direct
Diffuse
Cloud Cover
Global Radiation (W m -2)
1000
800
600
400
200
0
6
12
18
Time (PST)
1942.15
2018.52
2094.88
2171.24
2247.61
2323.97
2400.33
2476.69
2553.06
2629.42
2705.78
2782.15
2858.51
2934.87
3011.24
3087.60
3163.96


Model Iteration
Direct
Global Radiation (W m-2)
1000
800
600
400
200
0
6
12
Time (PS
0.00
2.52
5.04
7.55
10.07
12.58
15.10
17.61
20.13
22.64
25.16
27.67
30.19
32.70
35.22
37.73
>=40.25
1942.15
2018.52
2094.88
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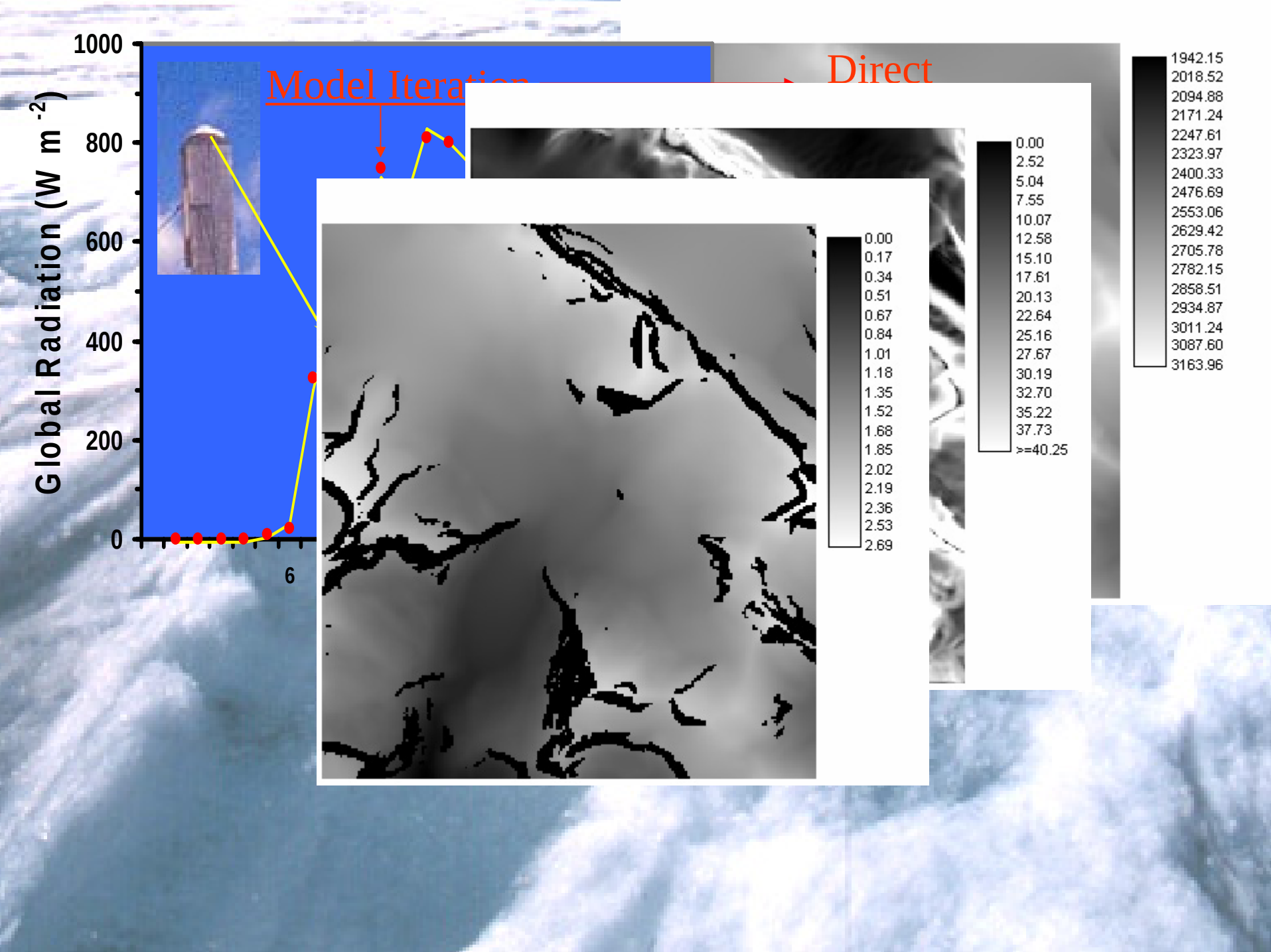
Model Iteration
Direct
Global Radiation (W m-2)
1000
800
600
400
200
0
6
0.00
0.17
0.34
0.51
0.67
0.84
1.01
1.18
1.35
1.52
1.68
1.85
2.02
2.19
2.36
2.53
2.69
0.00
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Global Radiation (W m-2)
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0.84
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1.18
1.35
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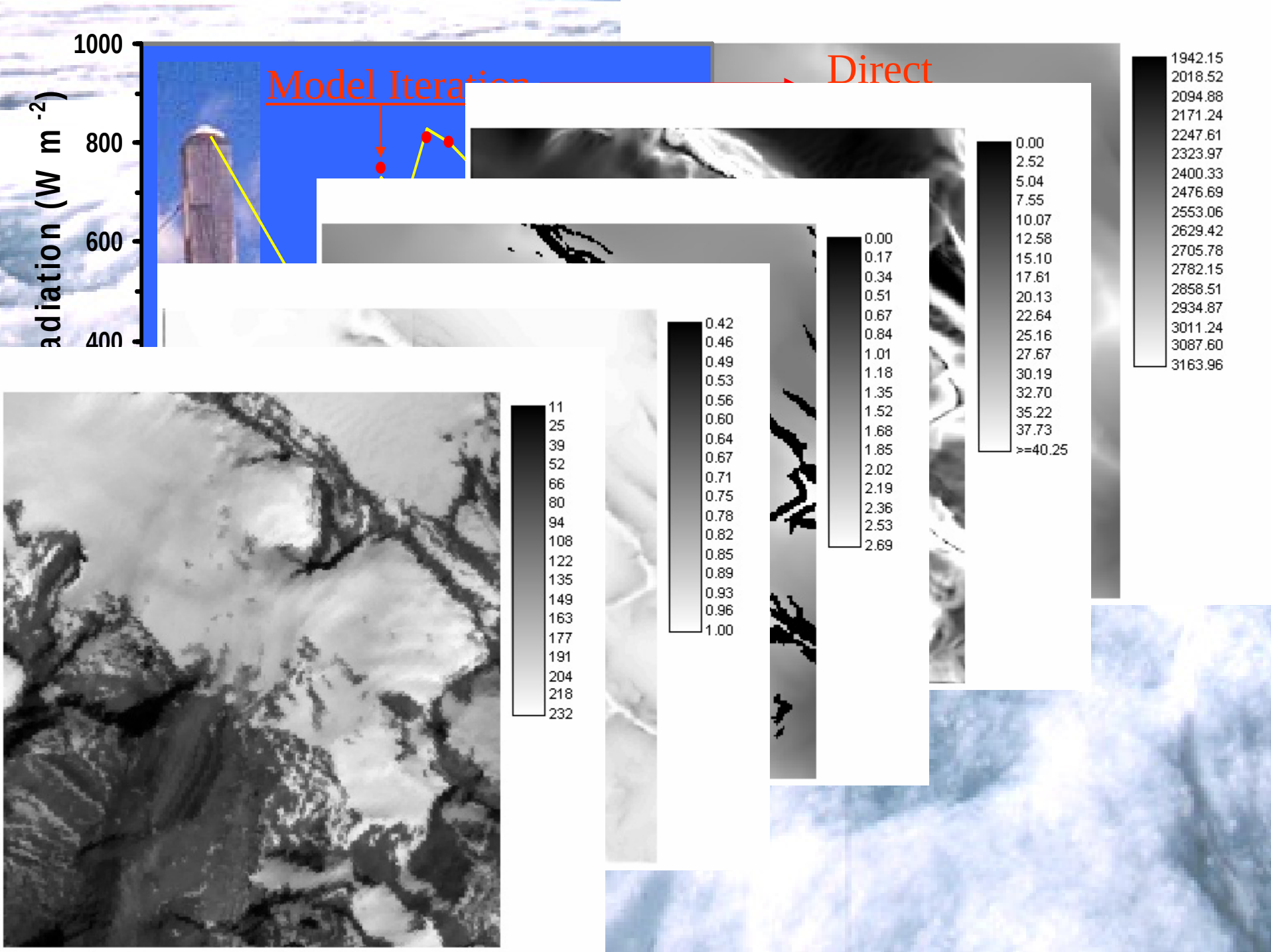
1.85
2.02
2.19
2.36
2.53
2.69
0.42
0.46
0.49
0.53
0.56
0.60
0.64
0.67
0.71
0.75
0.78
0.82
0.85
0.89
0.93
0.96
1.00


Model Iteration
Direct
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400
adiation (W m -2)
1942.15
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0.85
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0.96
1.00
11
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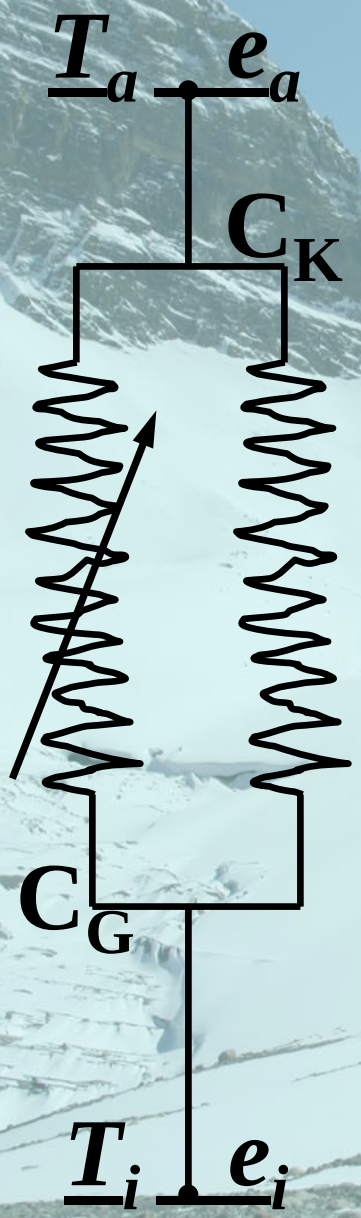
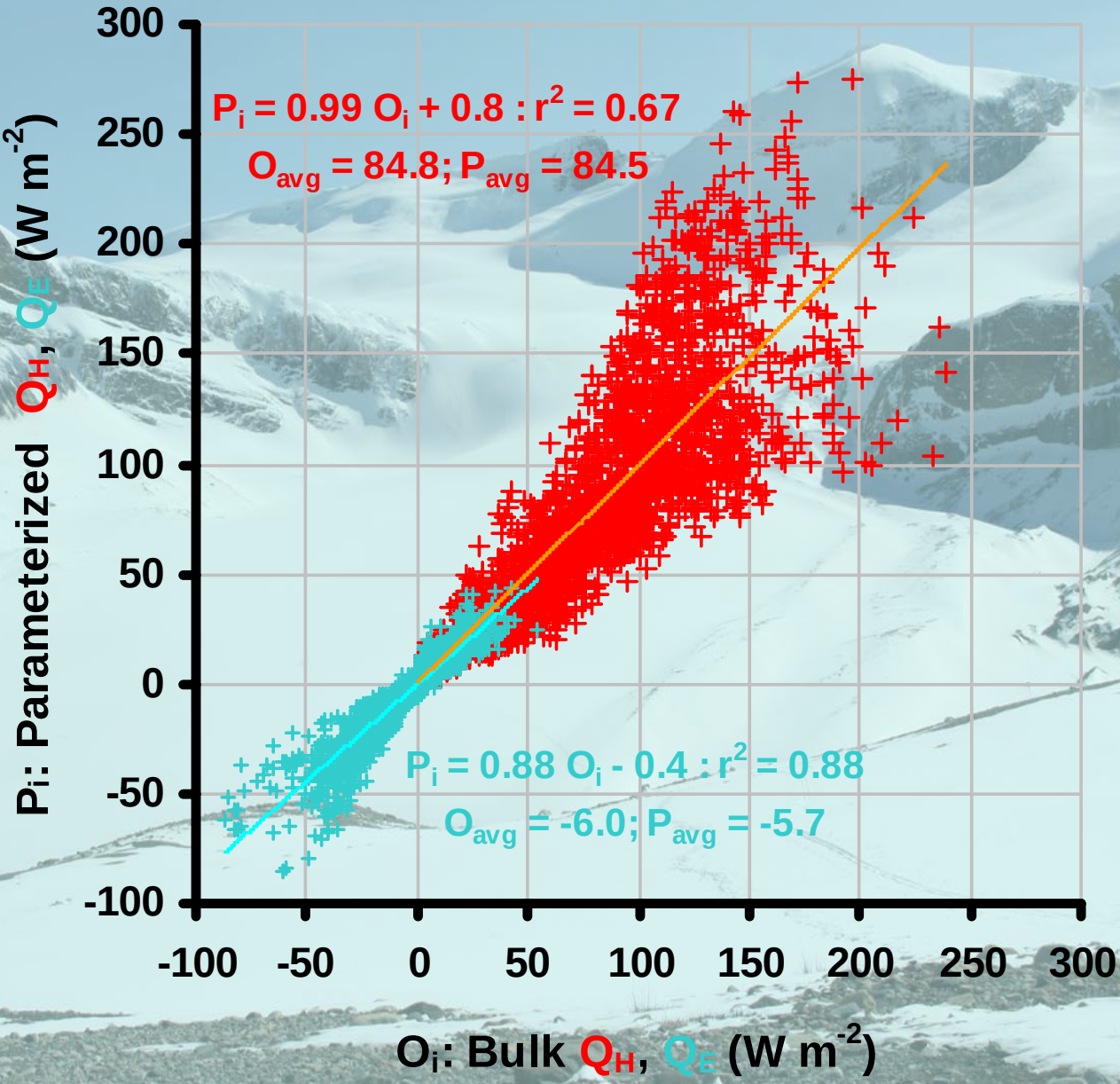
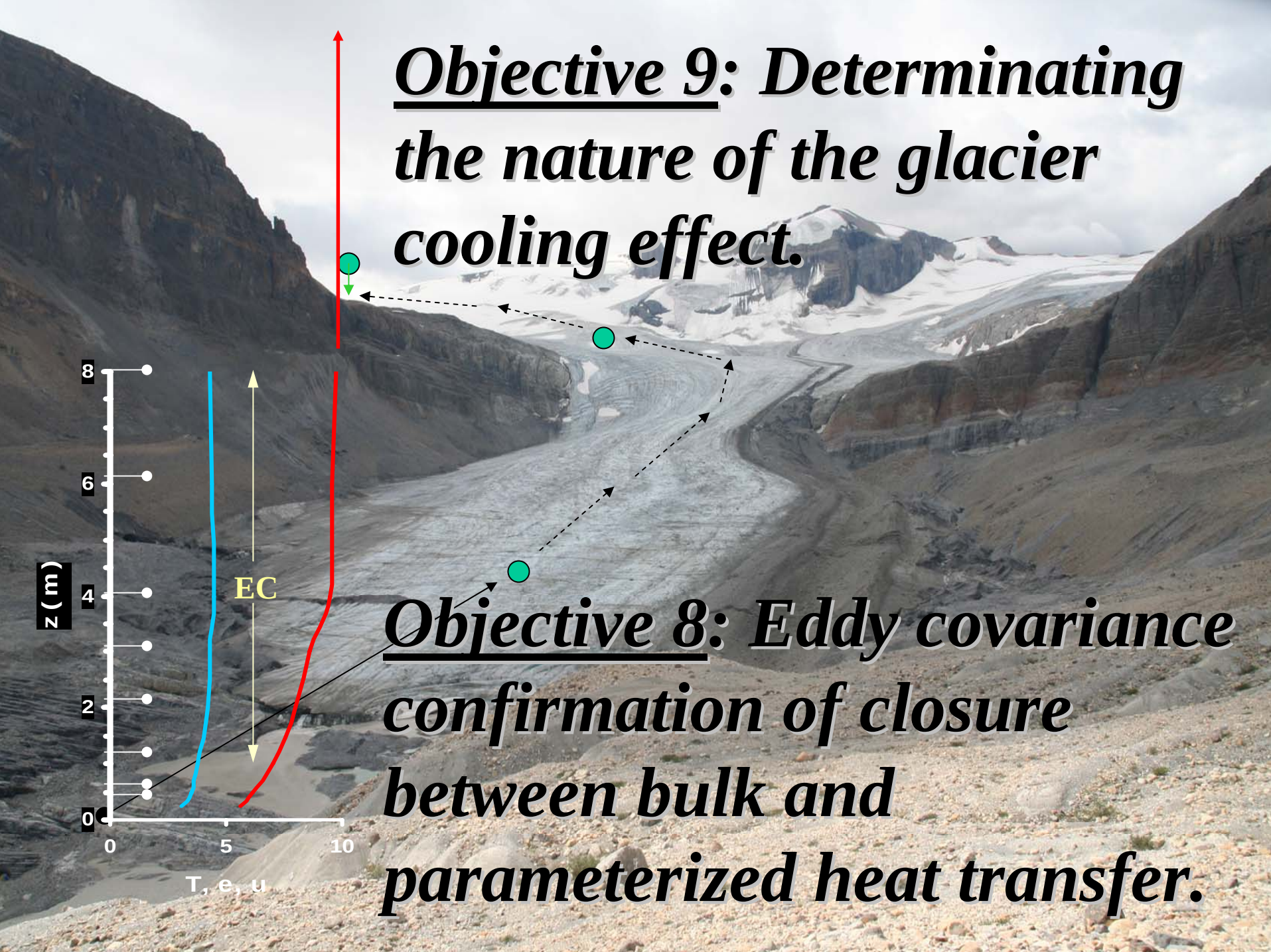
66
80
94
108
122
135
149
163
177
191
204
218
232

Oerlemans & Grisogono Approach (2002)



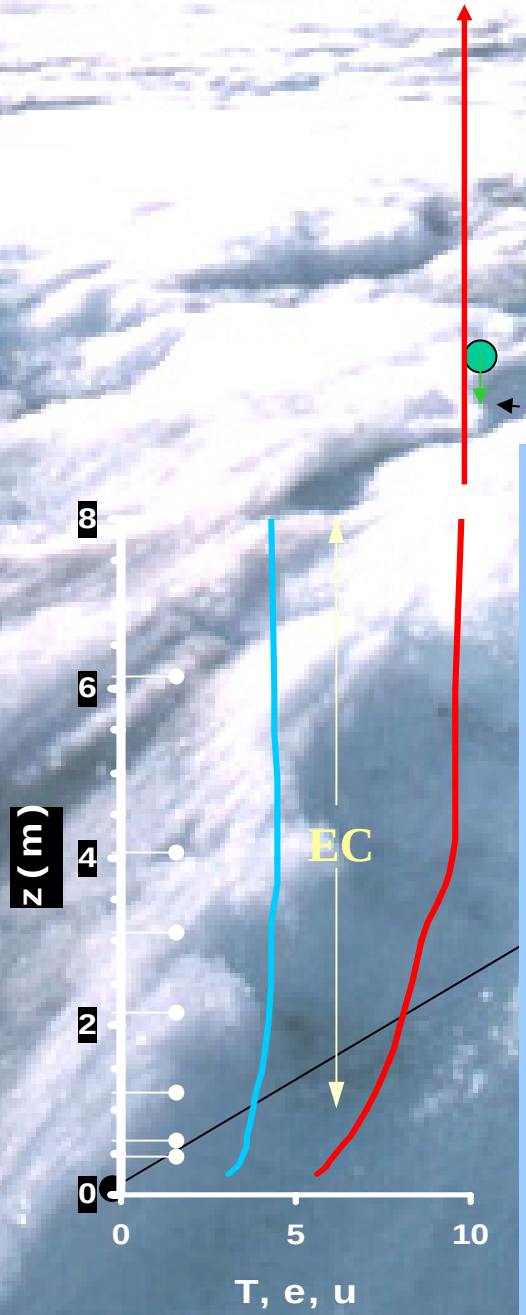


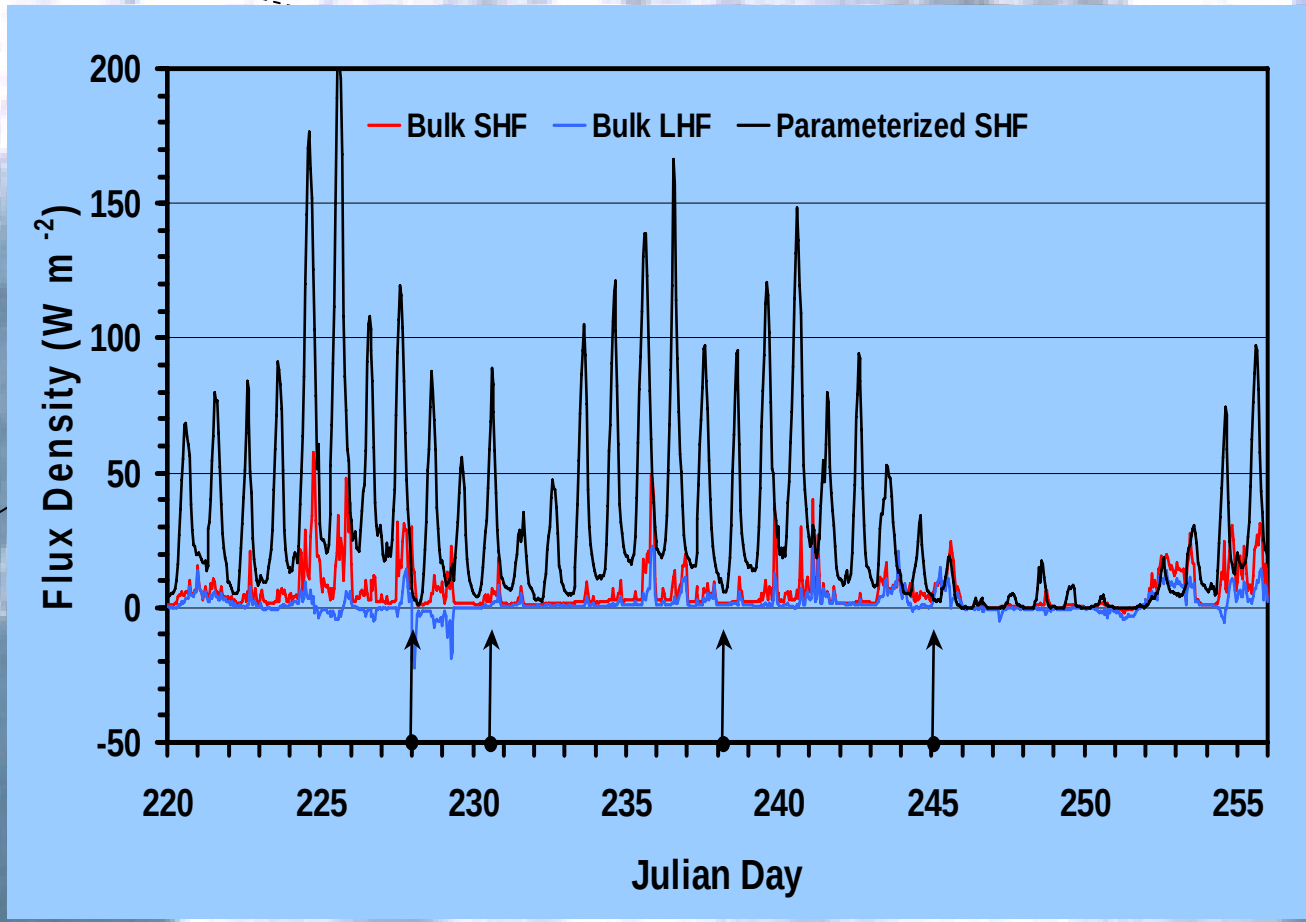


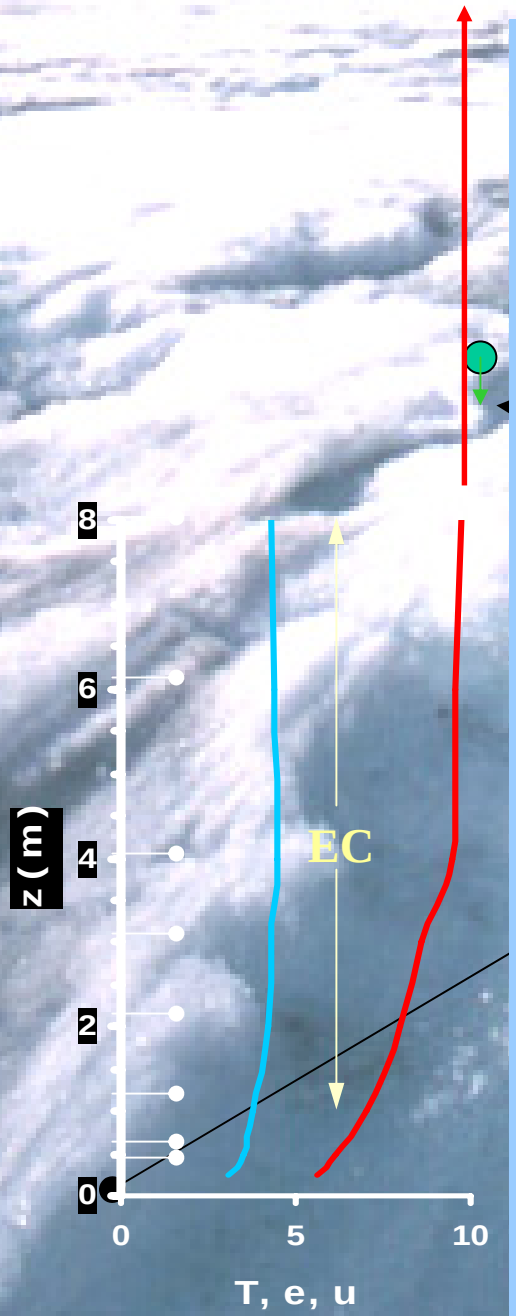
Objective 9: Determinating the nature of the glacier cooling effect.

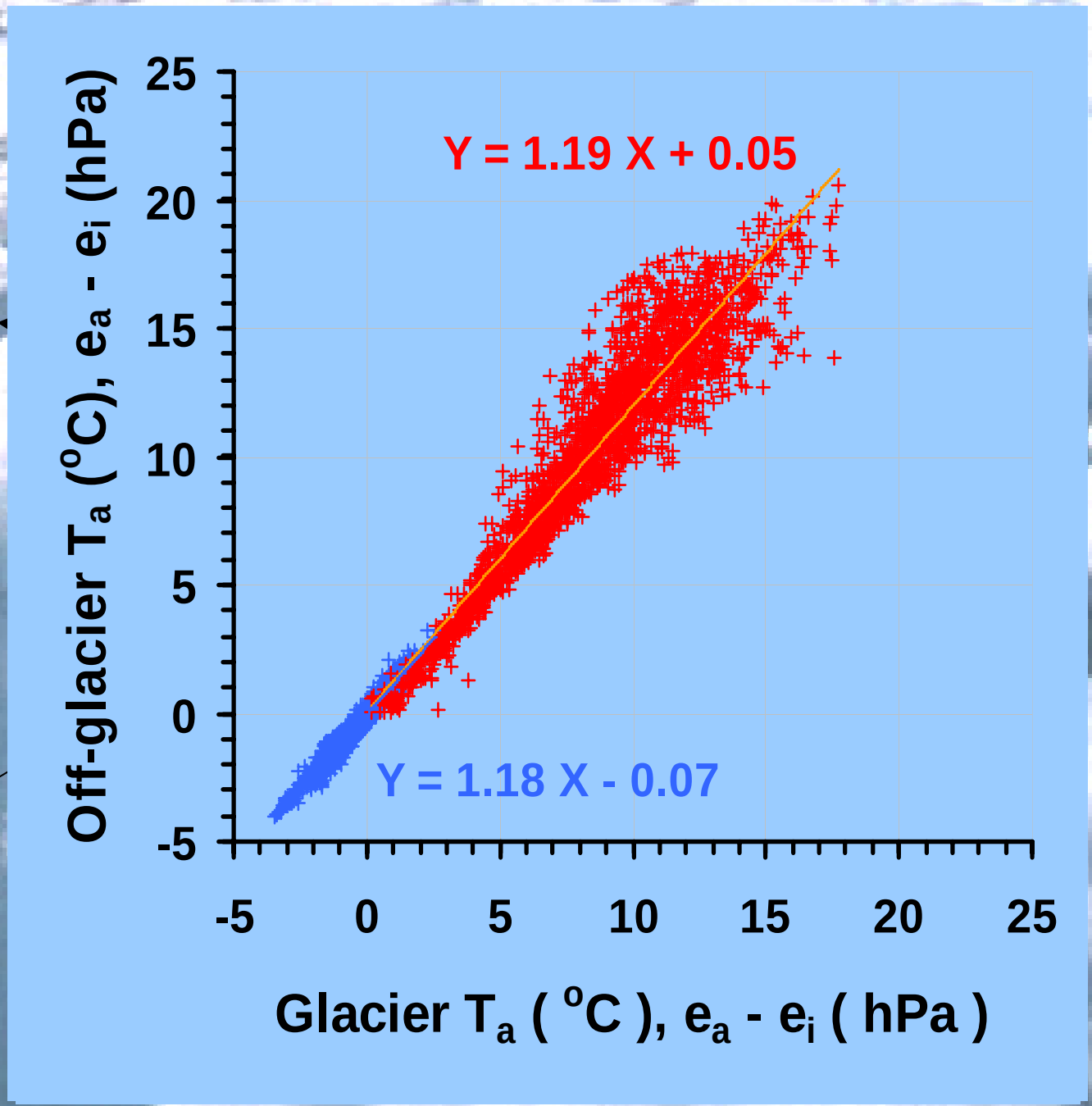
Objective 8: Eddy covariance confirmation of closure between bulk and parameterized heat transfer.

Objective 9: Determinating the nature of the glacier cooling effect.






8
6
4
2
0
z (m)
EC
0
5
10
T, e, u


Y = 1.19 X + 0.05
Y = 1.18 X - 0.07
Off-glacier T_a (^oC), e_a - e_i (hPa)
Glacier T_a (^oC), e_a - e_i (hPa)
25
20
15
10
5
0
-5
-5
0
5
10
15
20
25

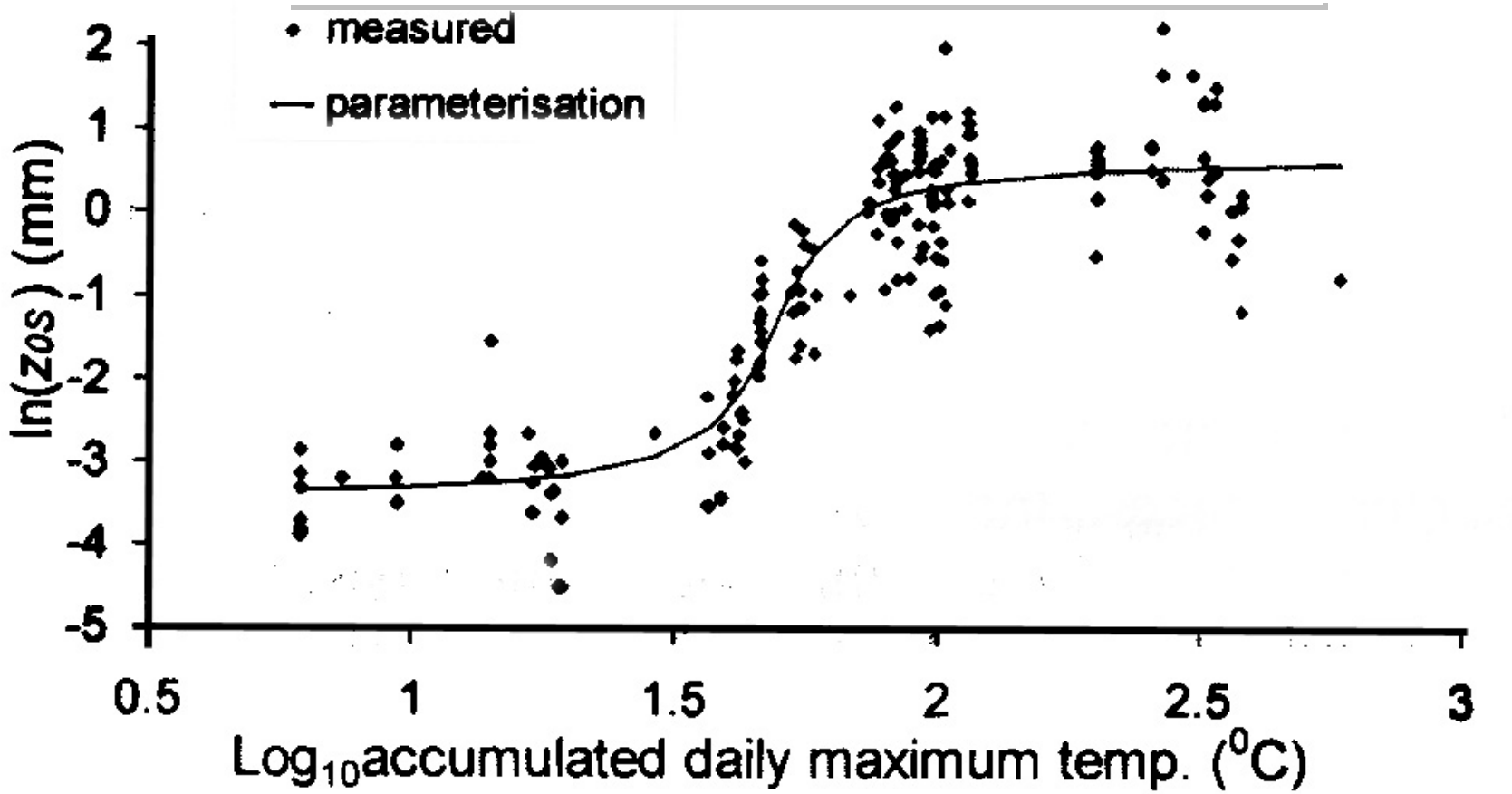


Fig. 7. Variation of the non-linear $\ln(z_{0S})$ parameterization (Equation (8)) and measured $\ln(z_{0S})$ values, with accumulated daily maximum temperatures since snowfall.

(Brock, Willis and Sharp 2006. *J. Glaciology*, 52:281-297)

Resolution and Δ meltwater generation relative to a 25 m HRU (%)

(Naoumov, 2006. M.Sc., University of Toronto)**

Resolution	*100 m*	*25 m*	*10 m*	*1 m*
Tongue	+1.1	0	+1.3	-2.8
Icefall	-0.4	0	+0.7	+4.8
Snowfield	+1.2	0	+0.4	+0.6

** *due solely to global radiation receipt*