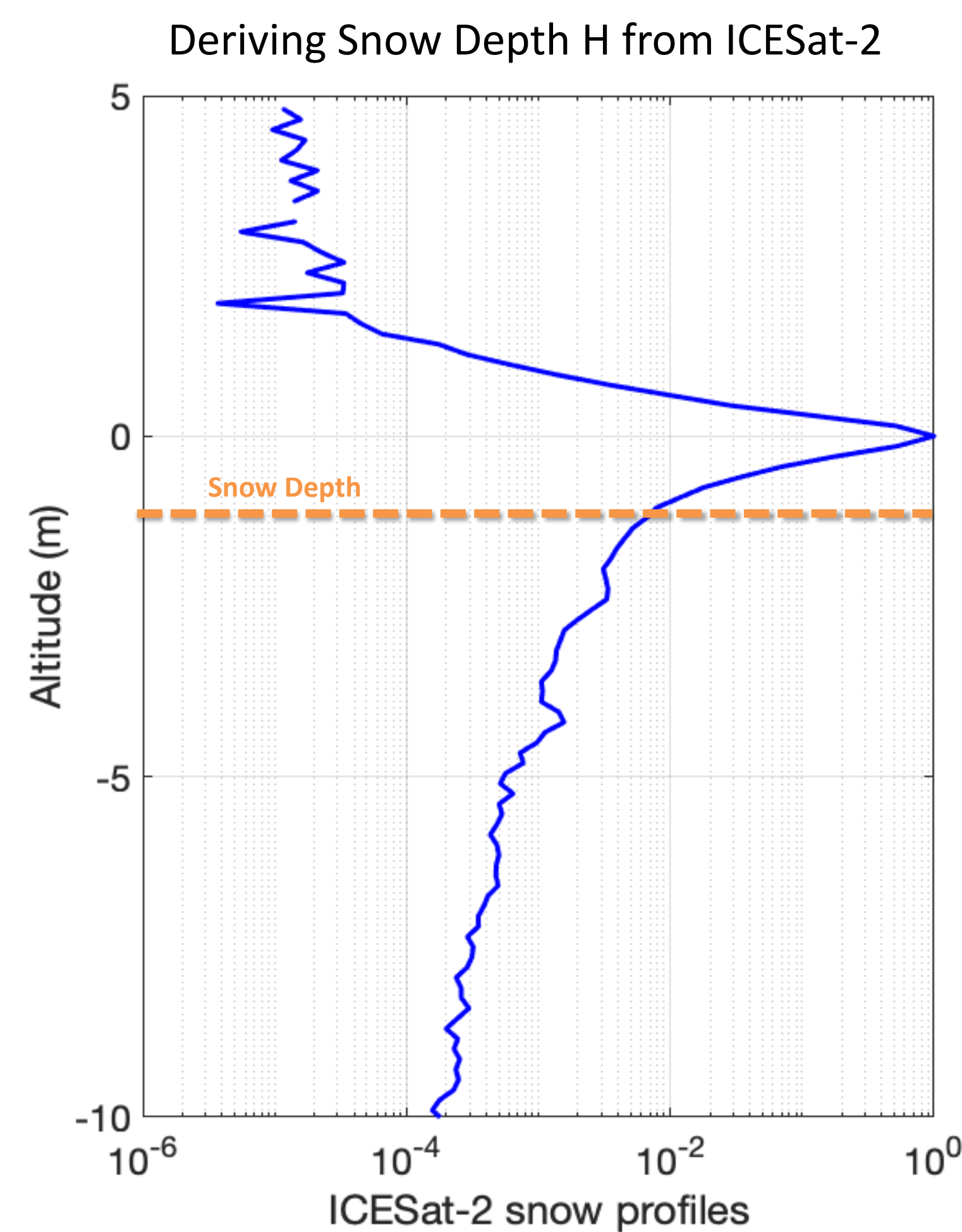


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Snow Depth From ICESat-2 and AMSR-2

Yongxiang Hu¹, Xiaomei Lu¹, Sunny Sun-Mack¹

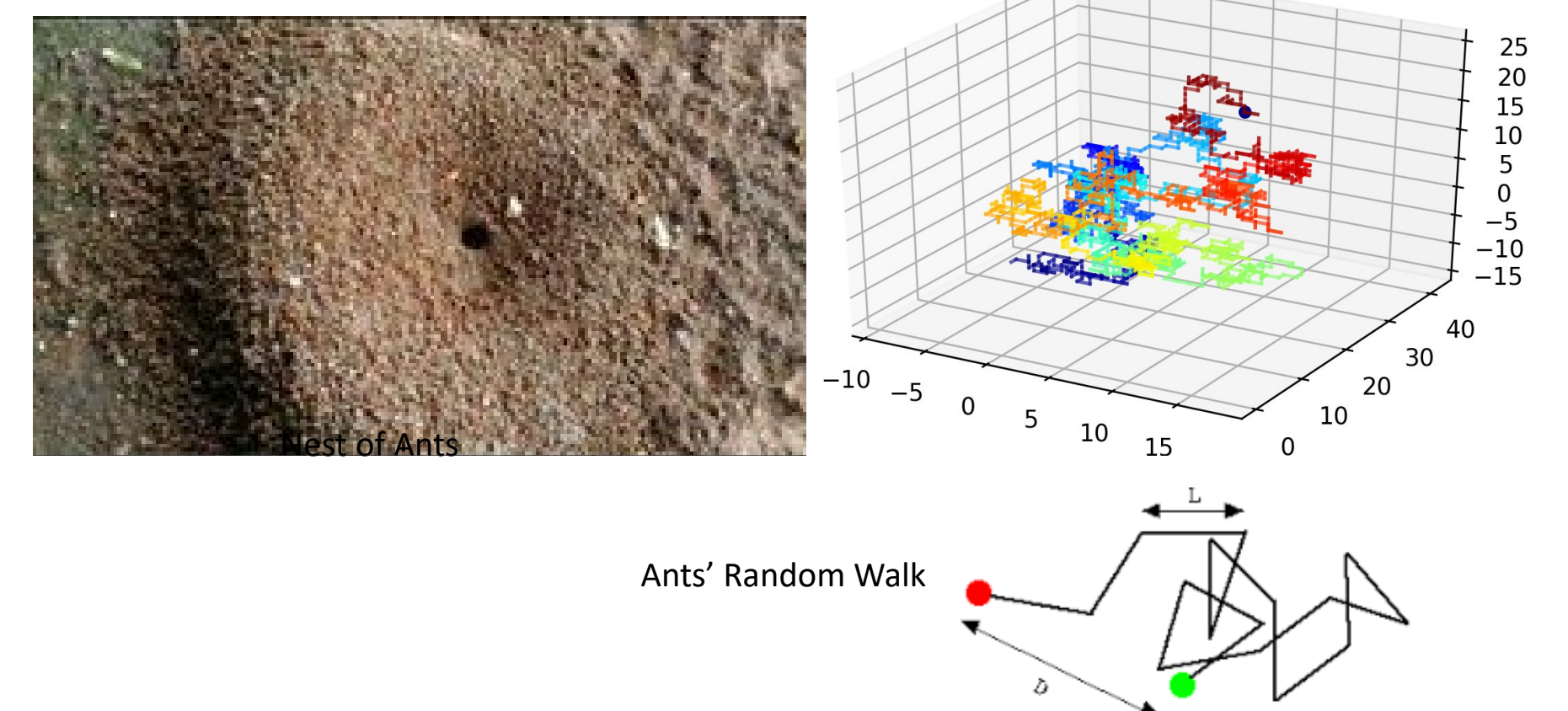
¹ NASA LaRC, Hampton, VA, USA



Snow Depth from lidar: A multiple scattering method
 Hu et al., 2022;
 Lu et al., 2022

(LaRC, Univ Arizona, GSFC, Stevens, Ball Aerospace)

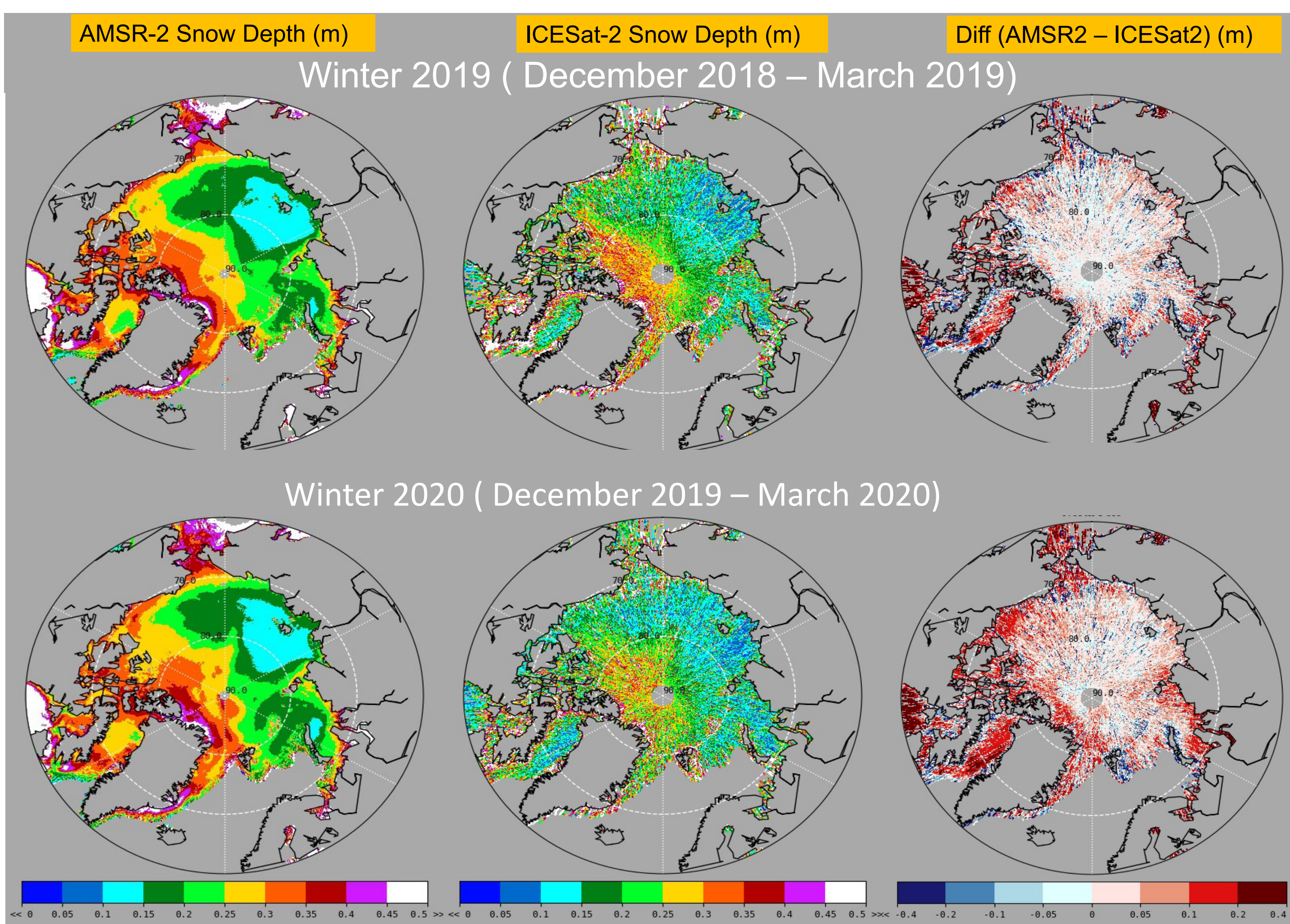
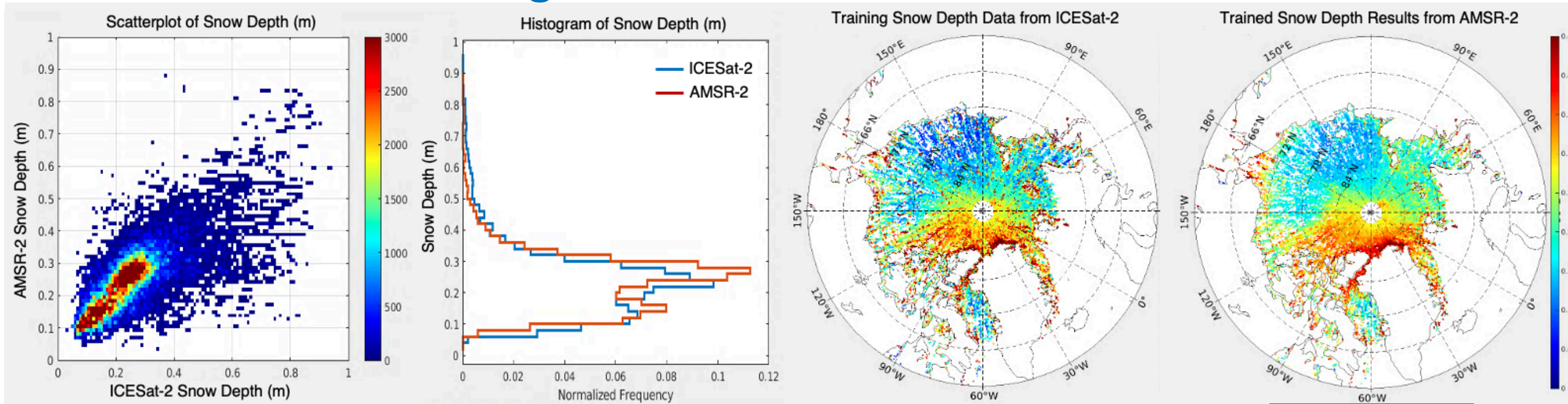
Thanks for the continuing support from NASA SMD Earth Science R&A and IIP Programs.



Average Distance Ants Traveled Inside the Colony = $4 \frac{\text{Volume}}{\text{Surface Area}}$

Averaged Distance Photons Traveling Inside Snow = $4 \frac{\text{Volume}}{\text{Surface Area}} = 2 * \text{Snow Depth}$

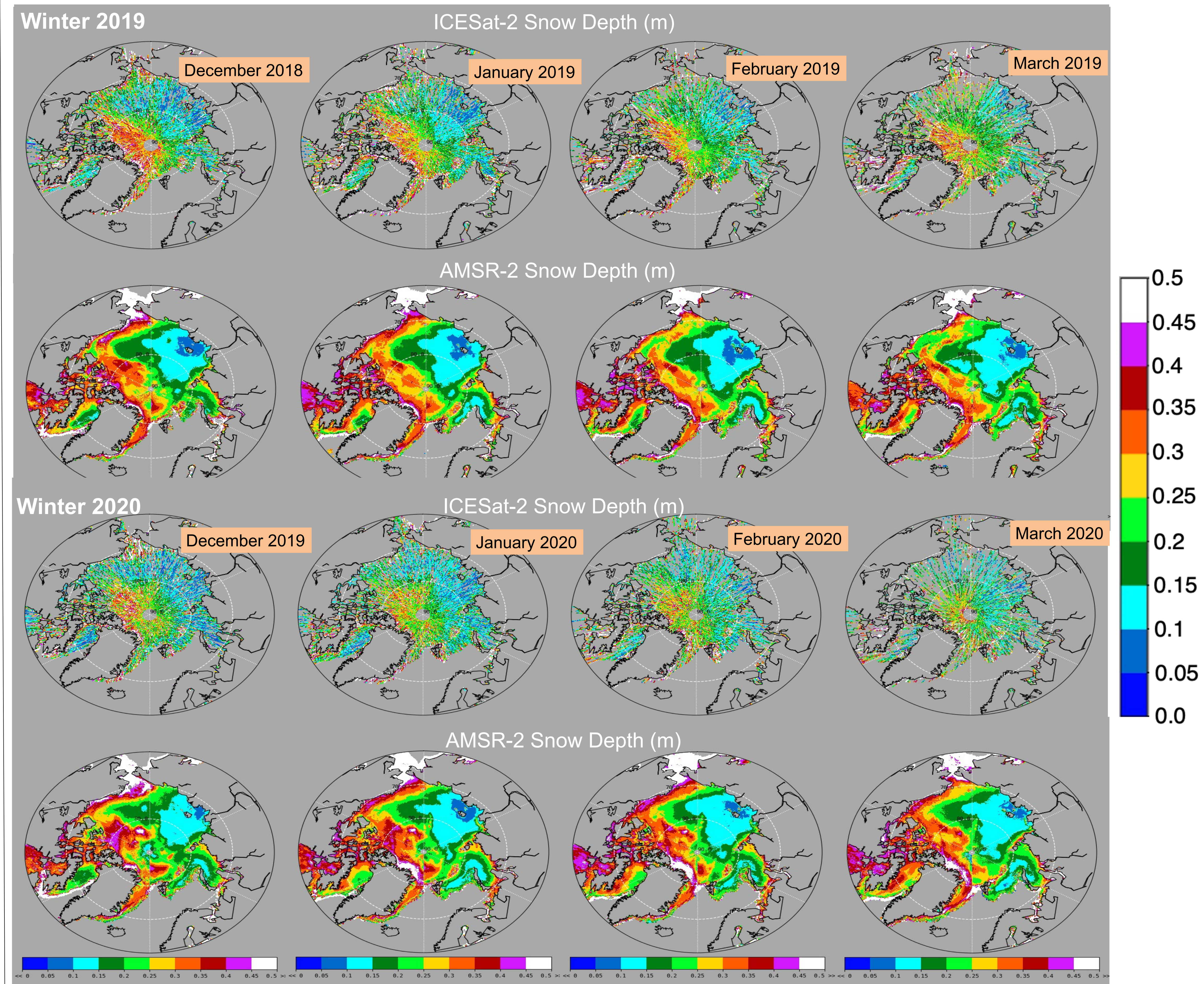
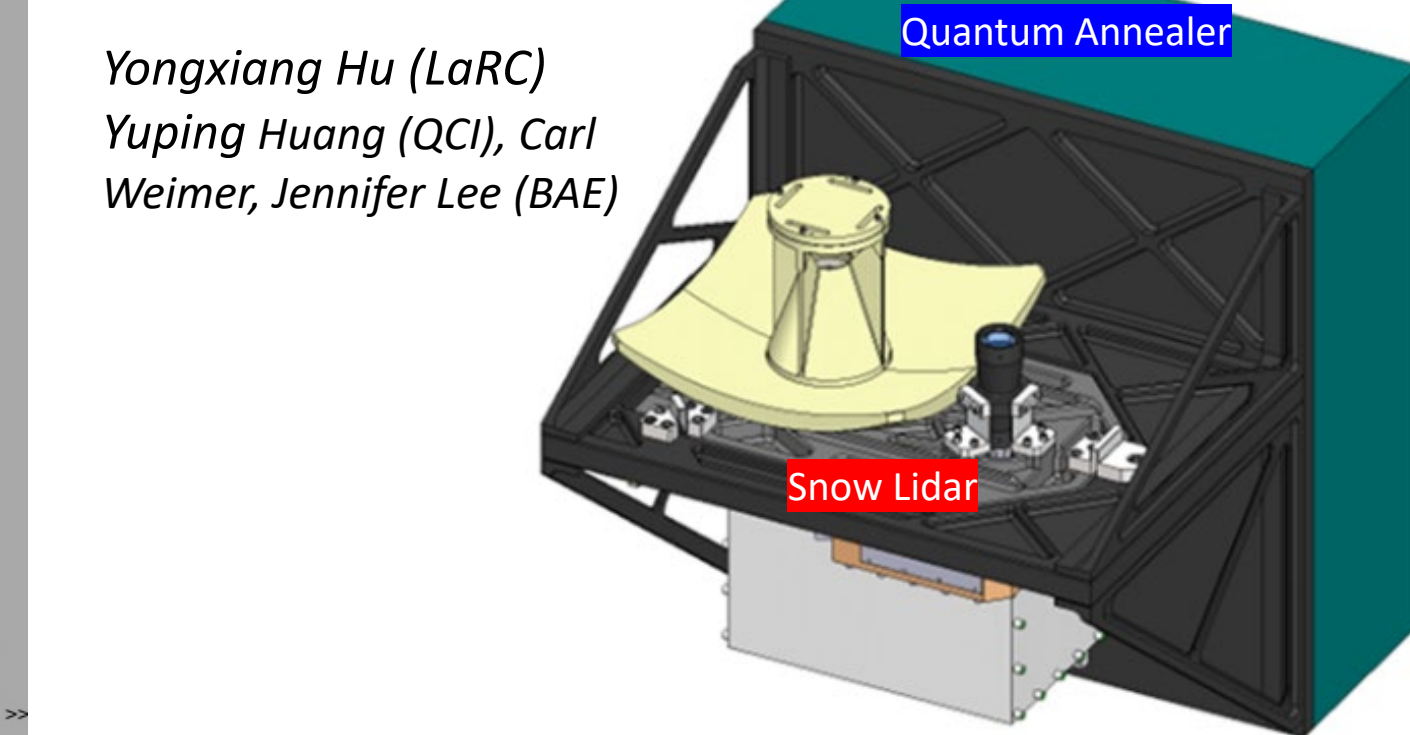
Neural Network Training



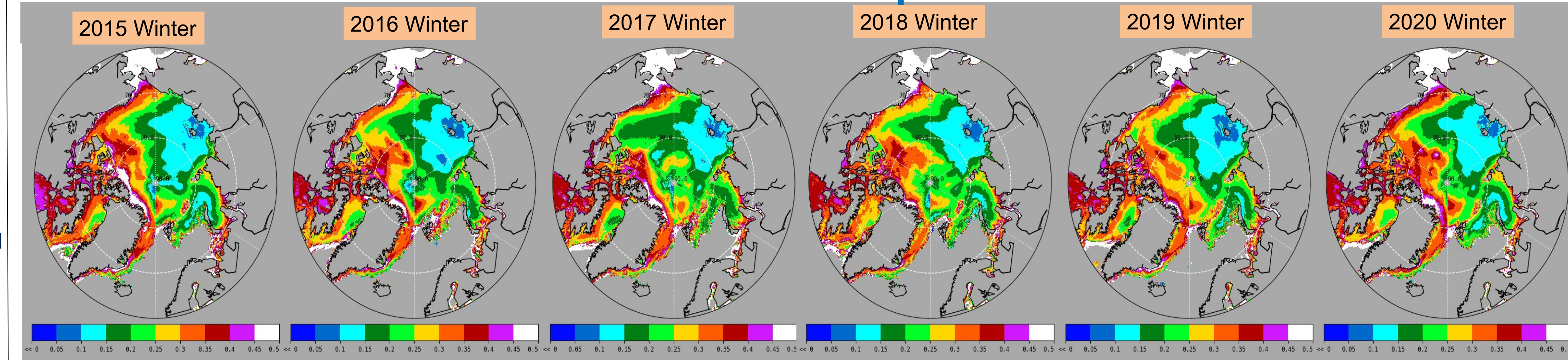
Winter 2019:
 ICESat-2 (m): mean 0.26, STDev 0.11
 AMSR-2 (m): mean 0.26, STDev 0.08
 Diff (AMSR2-ICESat2) (m): mean 0, STDev 0.09

Winter 2020:
 ICESat-2 (m): mean 0.24, STDev 0.11
 AMSR-2 (m): mean 0.27, STDev 0.08
 Diff (AMSR2-ICESat2) (m): mean 0.02, STDev 0.1

Smallsat snow lidar with onboard quantum denoising, measuring snow depth and snow density



Potential Climate Data Record of Snow Depth from AMSR-2



Reference

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- Lu, X., Hu, Y., Zeng, X., Stamnes, S. A., Neuman, T. A., Kurtz, N. T., et al. Deriving Snow Depth From ICESat-2 Lidar Multiple Scattering Measurements: Uncertainty Analyses. *Front. Remote Sens.* Accepted (2022)
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