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Plain Language Summary: This paper aims to develop S-Z and S-Z-DFR relationships for snow estimation using D3R radar in a coastal area. The velocity and diameter measured by the disdrometer is used to derive the snow density directly. Evaluation of the two snow estimation methods is performed at three sites (YPO, CPO, and DGW), and the results show that the radar snowfall estimation agrees well with the ground observations at the three sites and S-Z-DFR algorithm performs better compared with S-Z algorithm.

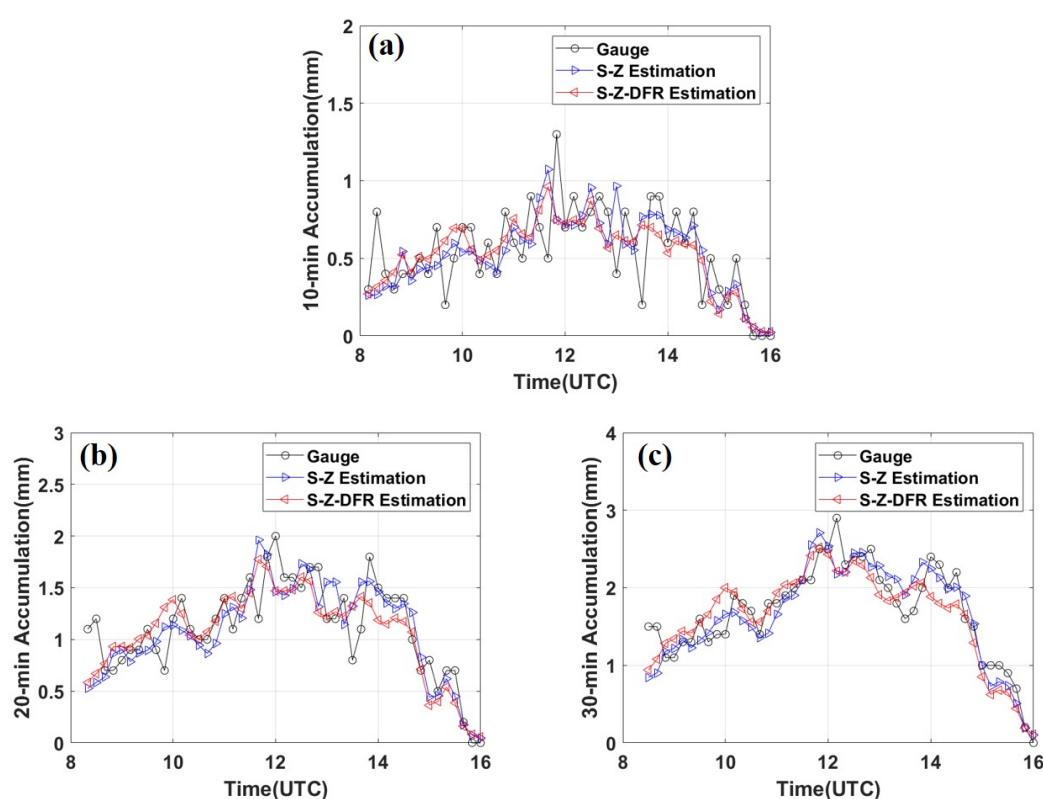


Figure 1. Snowfall estimation using S-Z and S-Z-DFR algorithm from D3R radar and gauge at the YPO site on February 28th, 2018 when the timescale is, (a)10-min, (b) 20-min, and (c) 30-min.

- Snowfall estimations using S-Z and S-Z-DFR algorithms for D3R radar are developed in this paper.
- Using the velocity and diameter measured by the disdrometer to derive the snow density directly is more accurate than using conventional power-law relationships between density and diameter.
- Snowfall estimation agrees well with the ground observations at the three sites and S-Z-DFR algorithm performs better compared with S-Z algorithm.