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An evaluation of Antarctic sea-ice thickness from the Global Ice-Ocean Modeling and Assimilation System based on in situ and satellite observations

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Comparison in standard deviation ratio of sea-ice thickness (SIT) and bias of SIT between GIOMAS and satellite observations

The standard deviation ratio of SIT and bias of SIT between GIOMAS and Envisat (ES)/CryoSat-2 (CS2) are compared to further verify the relationship between the variability of SIT and mean SIT in GIOMAS (Fig. S1). The standard deviation ratio of SIT is computed from GIOMAS/satellite observations and the bias of SIT is computed from GIOMAS minus satellite observations during their coincident segment (i.e., 2002-2011 for ES and 2010-2017 for CS2). The proportions of the dots with negative bias and ratio within 0-1 are 63.1% for GIOMAS/ES (Fig. S1a) and 82.4% for GIOMAS/CS2 (Fig. S1b), which means with a negative bias, GIOMAS tends to underestimate the variability of SIT in most cases.

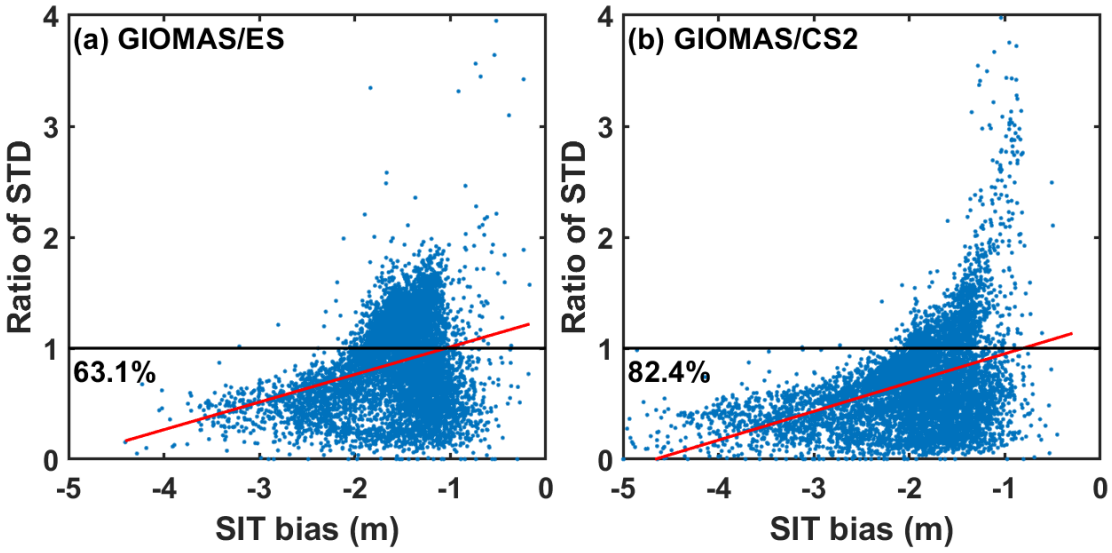

Figure S1. The scatter plot with standard deviations ratio versus SIT bias for GIOMAS/ES (a) and GIOMAS/CS2 (b). The standard deviations and the biases are calculated based on the SIT time series of GIOMAS and satellite observations in each grid cell. The standard deviation ratio of SIT is computed from GIOMAS/satellite observations and the bias of SIT is computed from GIOMAS minus satellite observations. Red solid lines are linear regression lines and the black solid lines mean the ratio is 1. The percentages denote the proportion of the dots with negative bias and ratio smaller than 1.