Supplementary to "A 12-Year Climate Record of Wintertime Wave-Affected Marginal Ice Zones in the Atlantic Arctic based on CryoSat-2" by Zhu et al.:
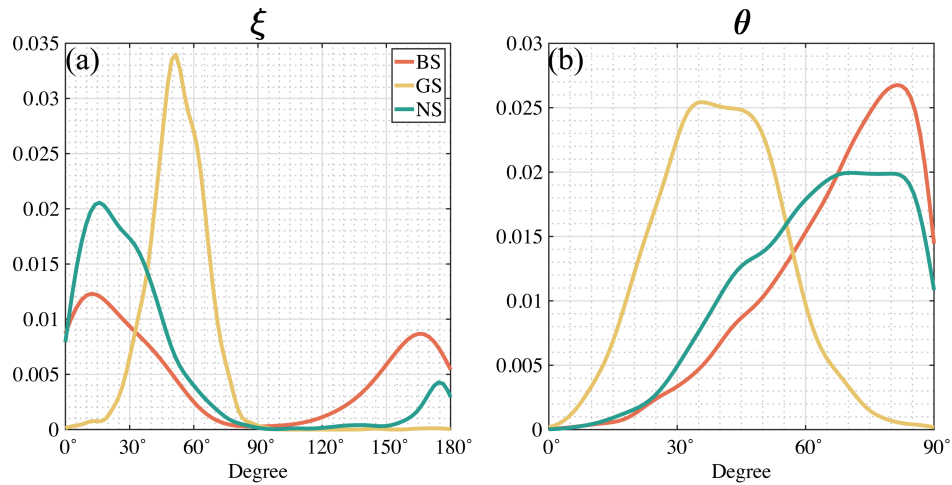
Figure list:

Figure S1. Probabilistic distribution of sea ice edge direction (ξ) and CS2 track-sea ice edge intersection angle (θ). All the CS2 tracks of the 12 winters are used to compute the statistics for the three regions (i.e., BS, NS and GS).
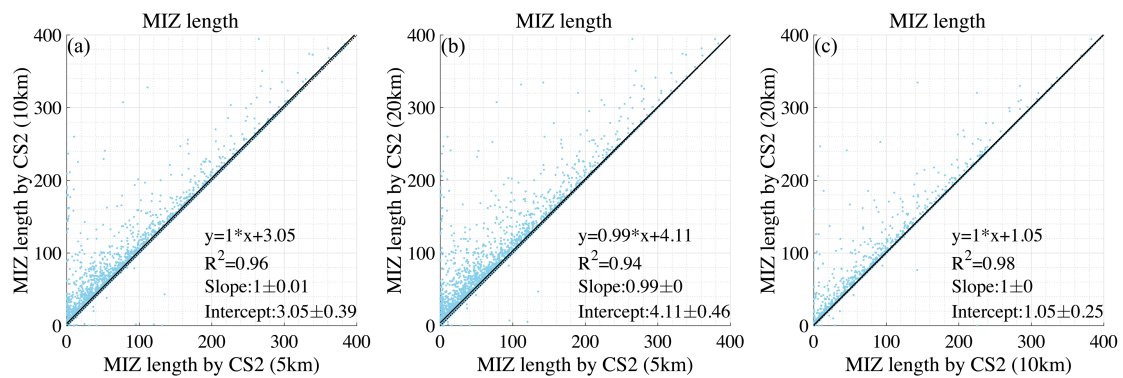

Figure S2. Comparison of along-track MIZ lengths retrieved with different window sizes of 5km, 10km and 20km: (a) comparison between 10km and 5km; (b) comparison between 20km and 5km; and (3) comparison between 20km and 10km.
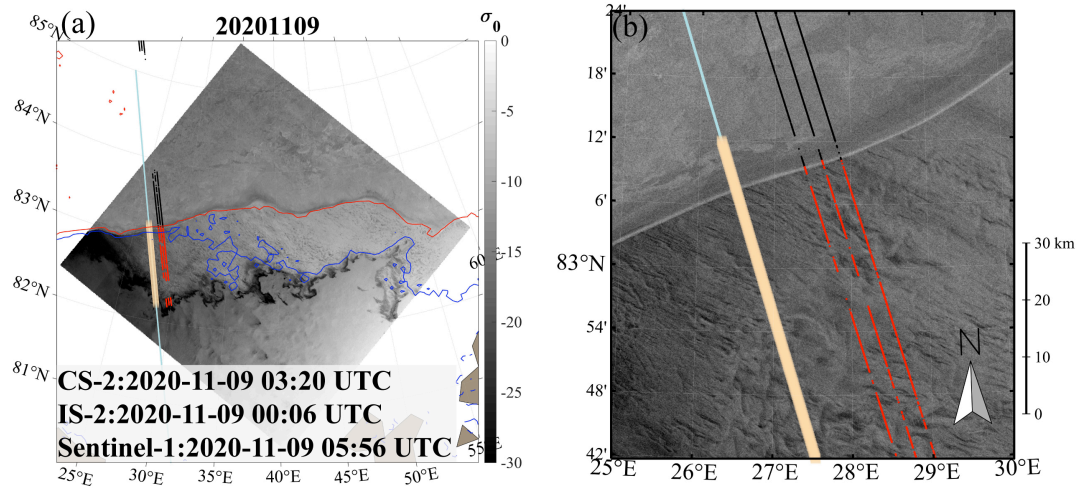
Figure S3. SAR image of the MIZ on 2020-11-09 and the retrieved MIZ by CS2 (blue/yellow line), IS2 (black/red line), and the spectral analysis. The whole SAR image of 400km by 400km is shown on the left, along with the visit times of the satellites (panel a), with the detail around the northern end of the MIZ on the right (panel b). The retrieved MIZ is shown with thick yellow line (CS2) and red lines (IS2). The daily SIC-based sea ice edge is also shown (blue and red lines for 15% and 80%, respectively). The 10km-scale detected MIZ with the SAR backscatter field and the spectral analysis (Appendix B) is marked by the red boxes.
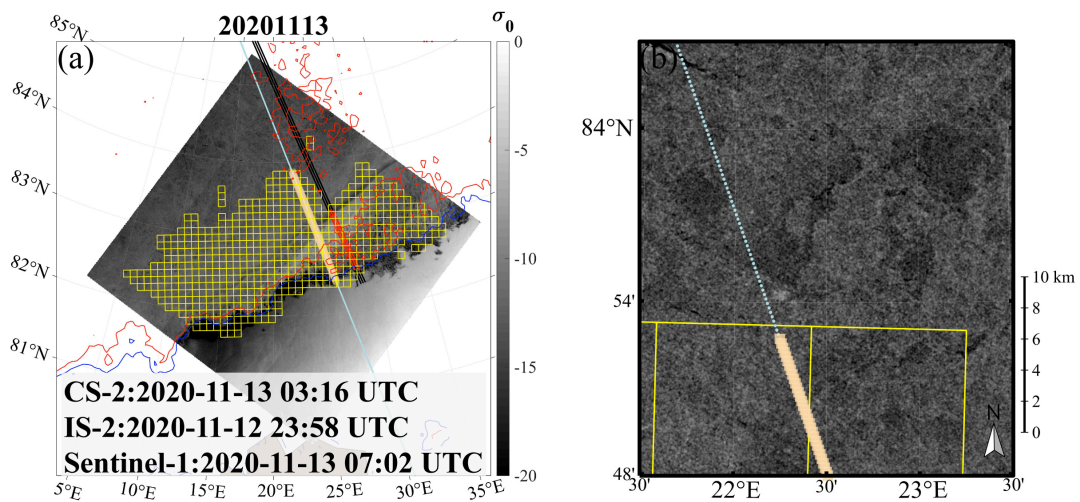

Figure S4. SAR image of the MIZ on 2020-11-13 and the retrieved MIZ by CS2, IS2, and the spectral analysis. Labels are the same as in Fig. S3.
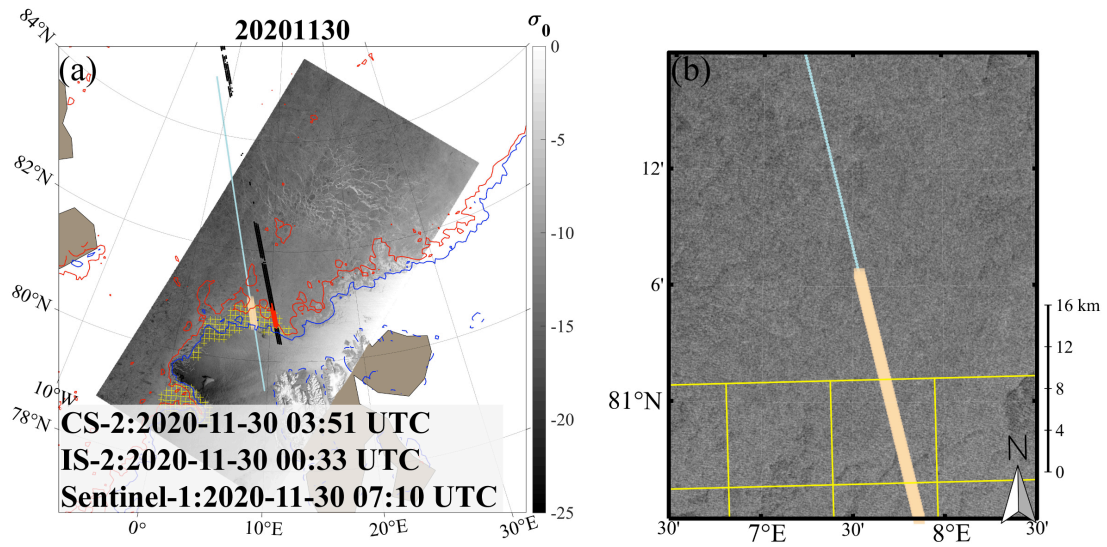
Figure S5. SAR image of the MIZ on 2020-11-30 and the retrieved MIZ by CS2, IS2, and the spectral analysis. Labels are the same as in Fig. S3.
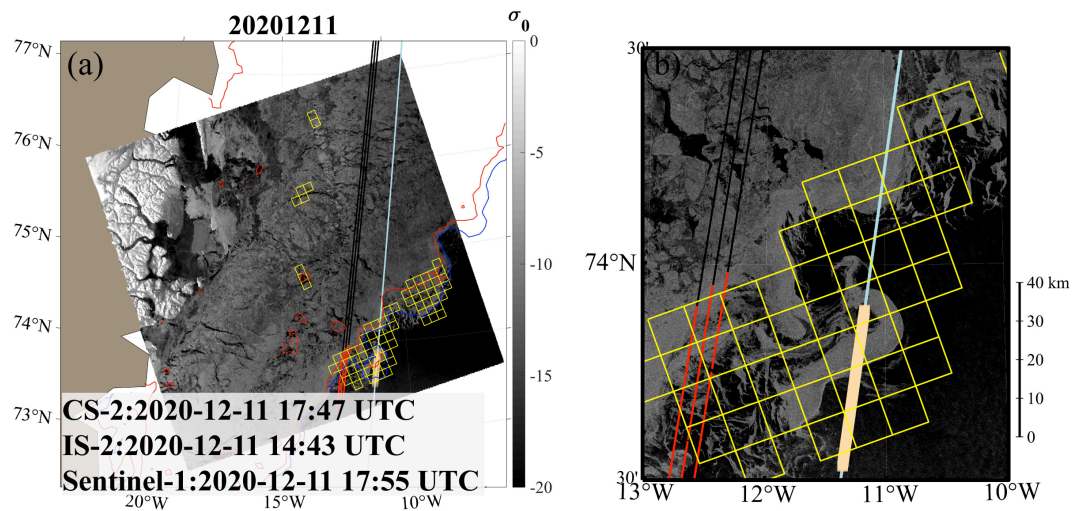

Figure S6. SAR image of the MIZ on 2020-12-11 and the retrieved MIZ by CS2, IS2, and the spectral analysis. Labels are the same as in Fig. S3.
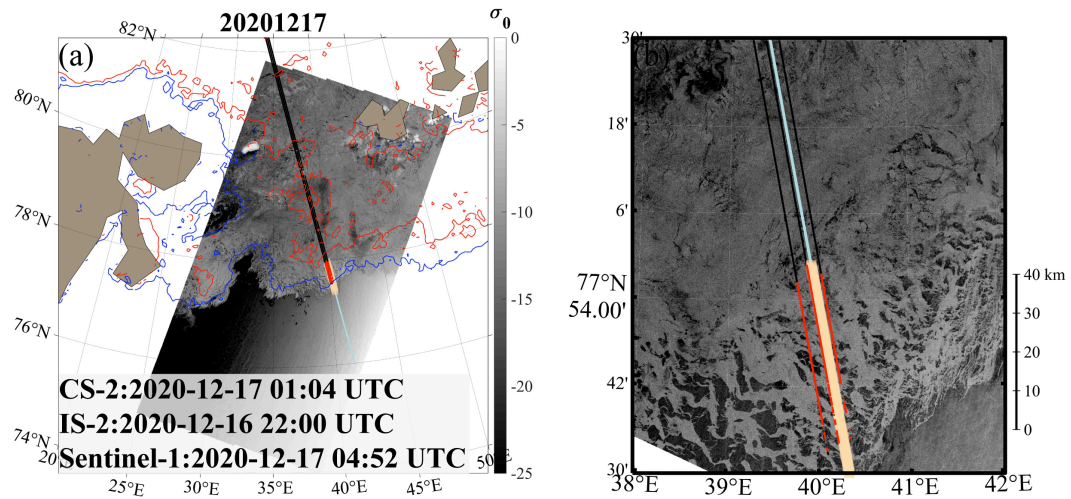
Figure S7. SAR image of the MIZ on 2020-12-17 and the retrieved MIZ by CS2, IS2, and the spectral analysis. Labels are the same as in Fig. S3.
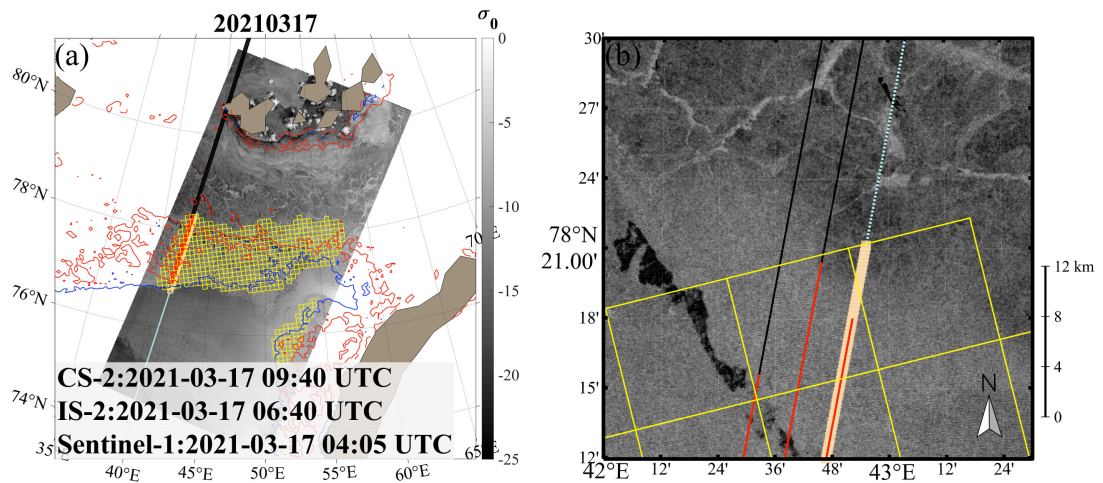

Figure S8. SAR image of the MIZ on 2021-03-17 and the retrieved MIZ by CS2, IS2, and the spectral analysis. Labels are the same as in Fig. S3.
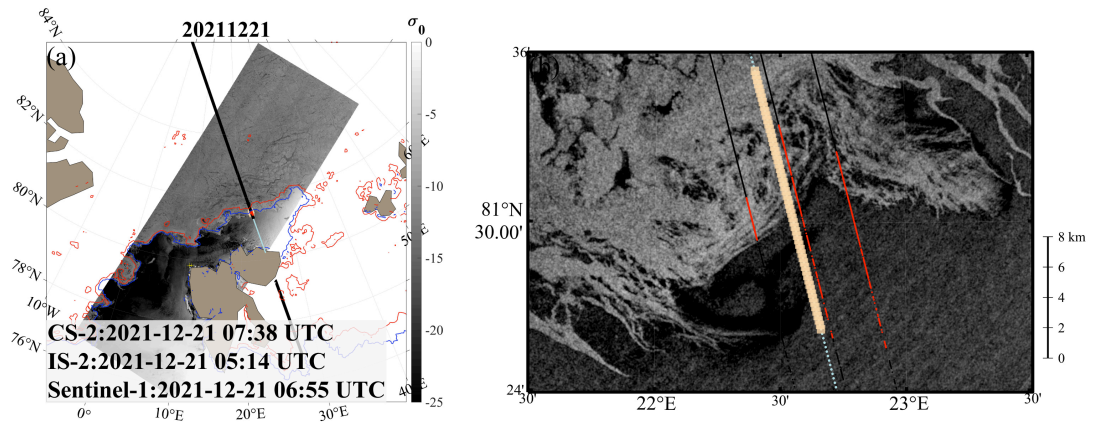
Figure S9. SAR image of the MIZ on 2021-12-21 and the retrieved MIZ by CS2, IS2, and the spectral analysis. Labels are the same as in Fig. S3.
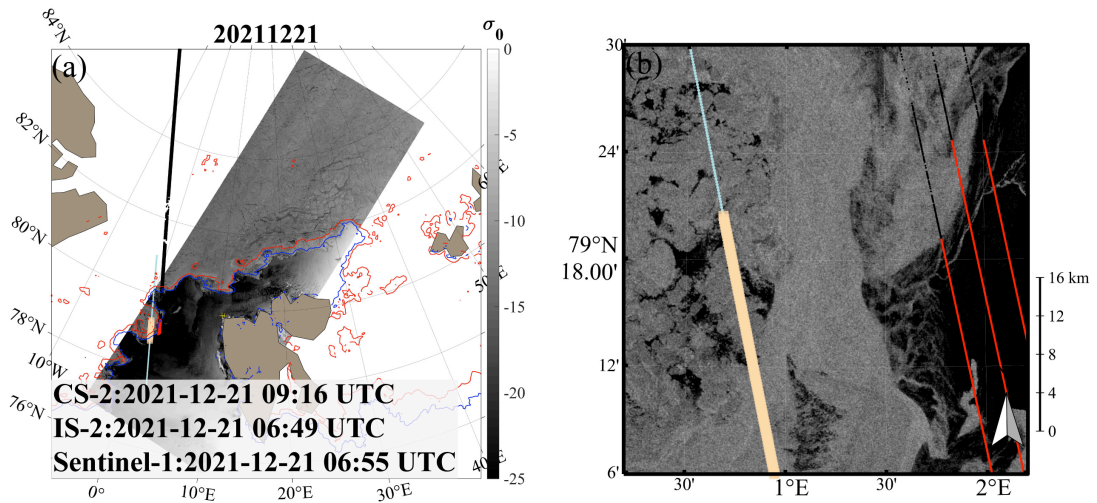

Figure S10. SAR image of the MIZ on 2021-12-21 and the retrieved MIZ by CS2, IS2, and the spectral analysis. Labels are the same as in Fig. S3.
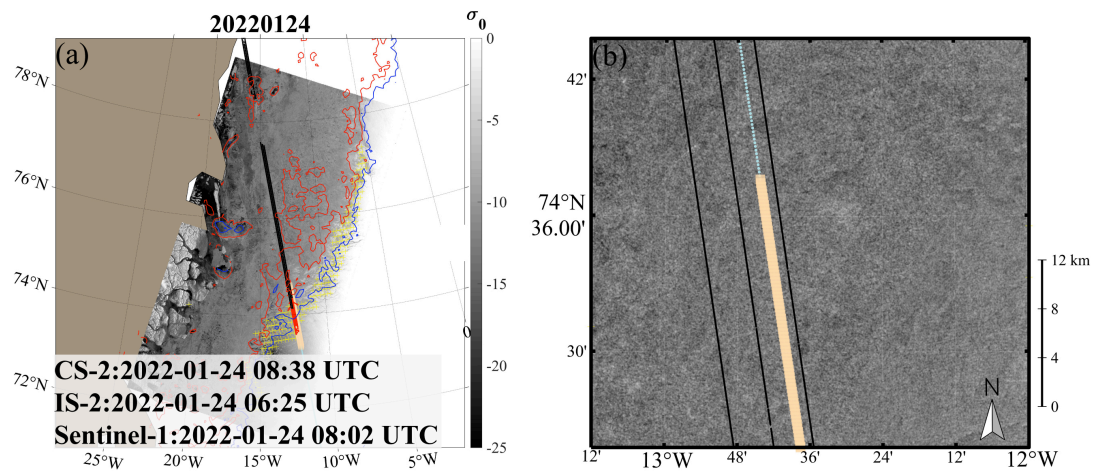
Figure S11. SAR image of the MIZ on 2022-01-24 and the retrieved MIZ by CS2, IS2, and the spectral analysis. Labels are the same as in Fig. S3.