Supplement for

Seeing through the Sea with Satellites:
Reconstructing Ocean Subsurface Temperature and Salinity with Satellite
Observations

Shizuo Liu and Shineng Hu[*]

Nicholas School of the Environment, Duke University, Durham, NC, USA

* Corresponding author. Email: shineng.hu@duke.edu

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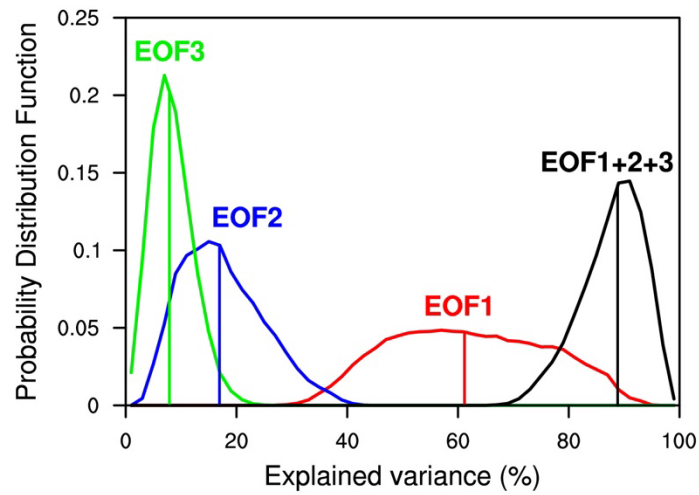
Fig. S1 to S6

Figure S1. Probability distribution function for the explained variance of EOF1 (red curve), EOF2 (blue curve), EOF3 (green curve) and the sum of the first three EOFs (black curve) for the global ocean. Instead of grid number-based, each grid is weighted by its area weight (see Data and Methods for details). The solid vertical lines show the median levels of the explained variance of each EOF or the sum of the first three EOFs.
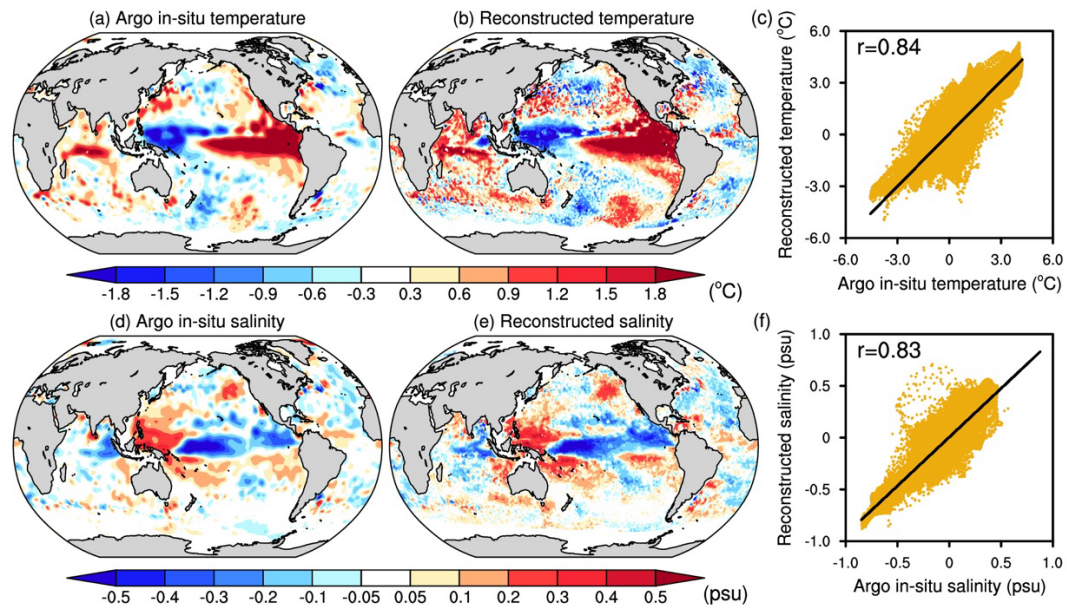
Figure S2. Comparisons of the spatial distribution of Argo in-situ (left column) and reconstructed (middle column) ocean subsurface temperature (a, b) and salinity (d, e) anomalies for the average of 1-100 m in January 2016 at 0.25º x 0.25º resolution. Scatter plots (right column) of Argo in-situ versus reconstructed temperature anomalies (c) and salinity anomalies (f) for all the global grids in January 2016. The correlation r between Argo in-situ data and reconstruction is shown in the left-upper side of each panel.

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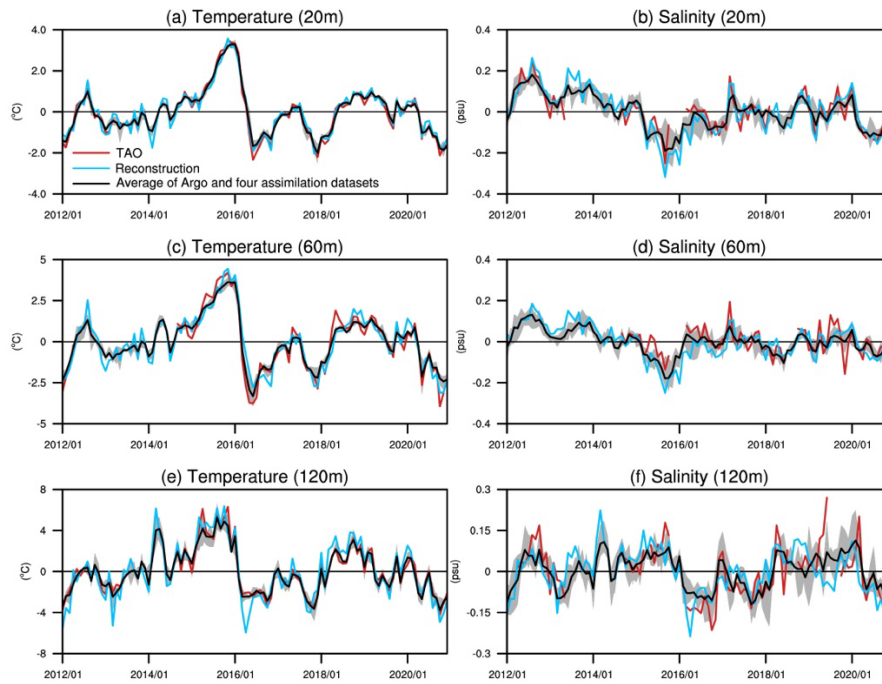
Figure S3. Comparisons between TAO/TRITON, our reconstruction, and other subsurface datasets at the site of EQ, 140º W for the depths at 20 m, 60 m and 120 m. The TAO/ TRITON time series is represented by the red curve, the reconstructed time series by the blue curve, and the average of Argo in-situ data and four assimilation data (ORAS5, SODA3, ECCO4r4, IAP) is depicted by the black curve. The gray shading curve denotes one standard deviation across the Argo, ORAS5, SODA3, ECCO4r4, and IAP datasets.

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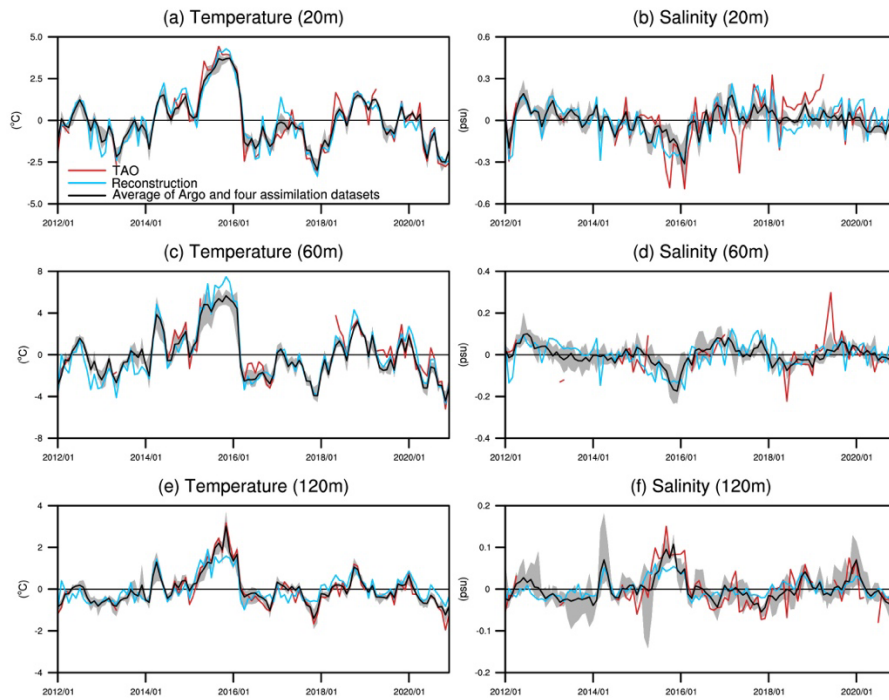
Figure S4. Comparisons between TAO/TRITON, our reconstruction, and other subsurface datasets at the site of EQ, 110º W for the depths at 20 m, 60 m and 120 m. The TAO/ TRITON time series is represented by the red curve, the reconstructed time series by the blue curve, and the average of Argo in-situ data and four assimilation data (ORAS5, SODA3, ECCO4r4, IAP) is depicted by the black curve. The gray shading curve denotes one standard deviation across the Argo, ORAS5, SODA3, ECCO4r4, and IAP datasets.

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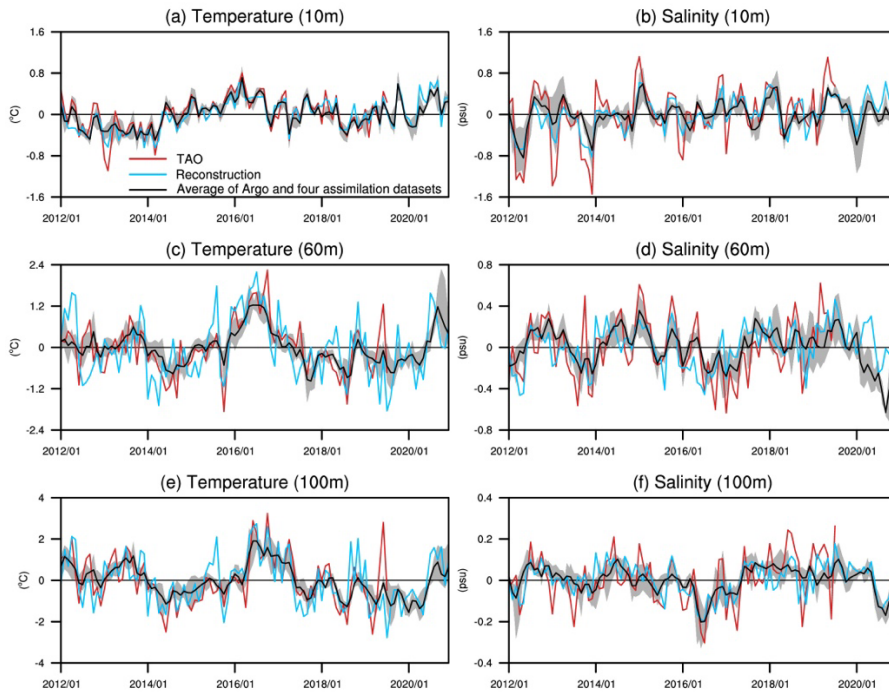
Figure S5. Comparisons between TAO/TRITON, our reconstruction, and other subsurface datasets at the site of 15° N, 90° E for the depths at 10 m, 60 m and 100 m. The TAO/ TRITON time series is represented by the red curve, the reconstructed time series by the blue curve, and the average of Argo in-situ data and four assimilation data (ORAS5, SODA3, ECCO4r4, IAP) is depicted by the black curve. The gray shading curve denotes one standard deviation across the Argo, ORAS5, SODA3, ECCO4r4, and IAP datasets.

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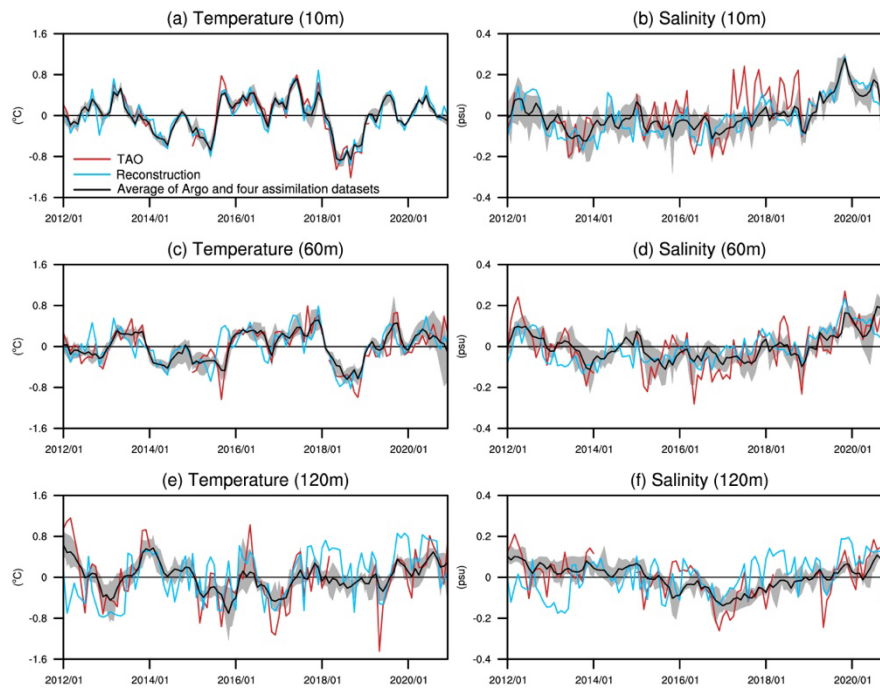
Figure S6. Comparisons between TAO/TRITON, our reconstruction, and other subsurface datasets at the site of 20º N, 142º W for the depths at 10 m, 60 m and 120 m. The TAO/ TRITON time series is represented by the red curve, the reconstructed time series by the blue curve, and the average of Argo in-situ data and four assimilation data (ORAS5, SODA3, ECCO4r4, IAP) is depicted by the black curve. The gray shading curve denotes one standard deviation across the Argo, ORAS5, SODA3, ECCO4r4, and IAP datasets.

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