# Supplementary materials

# Gap-filled subsurface mooring dataset off Western Australia during 2010-2023

Toan Bui[1], Ming Feng[1], Christopher Chapman[2]

[1]CSIRO Environment, Indian Ocean Marine Research Centre, Crawley, WA, Australia

[2]CSIRO Environment, Hobart, Tasmania, Australia

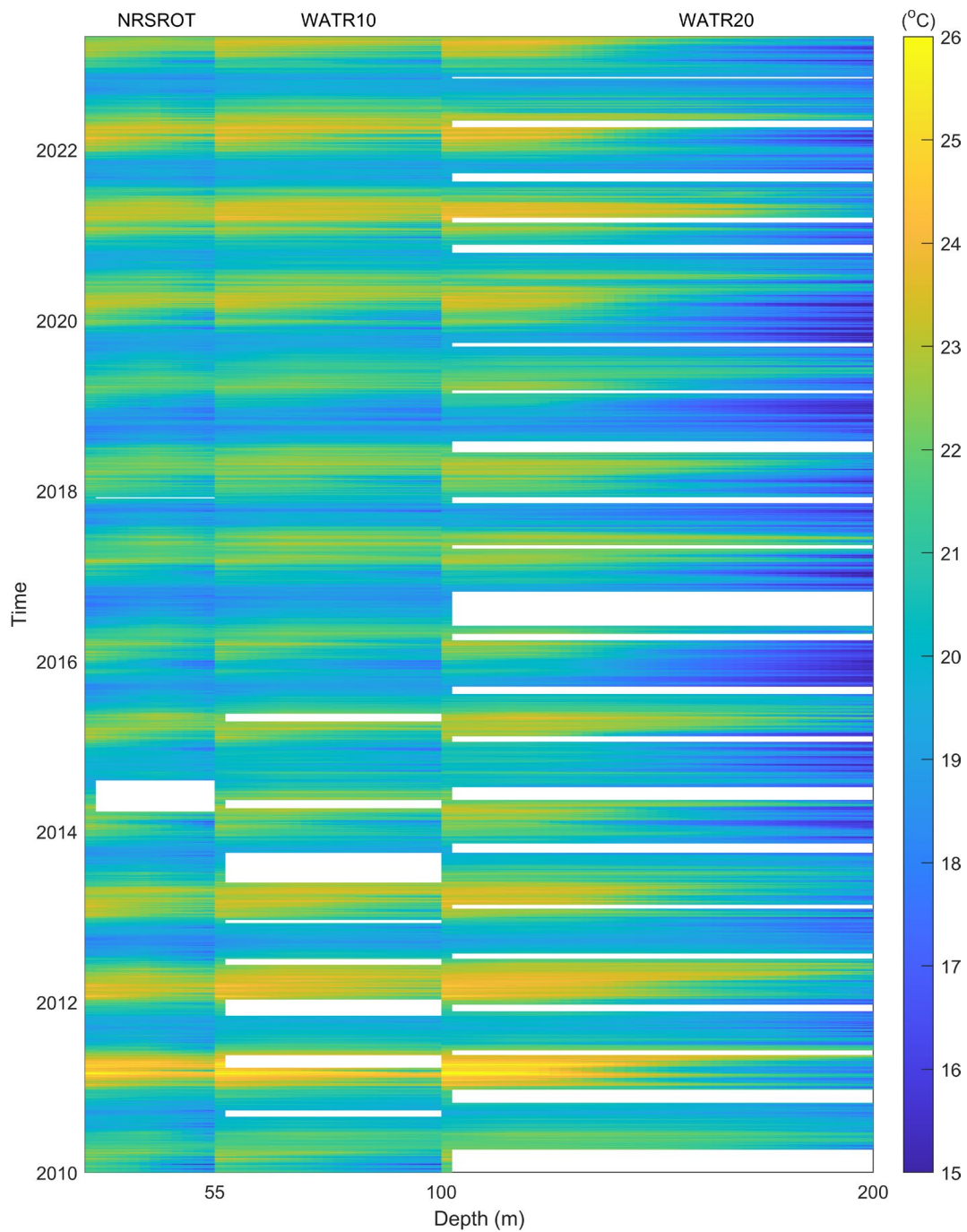*Correspondence to:* ming.feng@csiro.au

**Figure S1.** Data matrix of gridded daily, 5m-vertical resolution temperatures for NRSROT, WATR10 and WATR20. The bottom x axis shows the maximum depth of each moorings, while y axis presents time period from Jan 2010 to May 2023. Note that 0m follows directly after preceding mooring. The SST data are derived from the Regional Australian Multi-Sensor SST Analysis (RAMSSA) version 1.0. White space indicates missing observations.
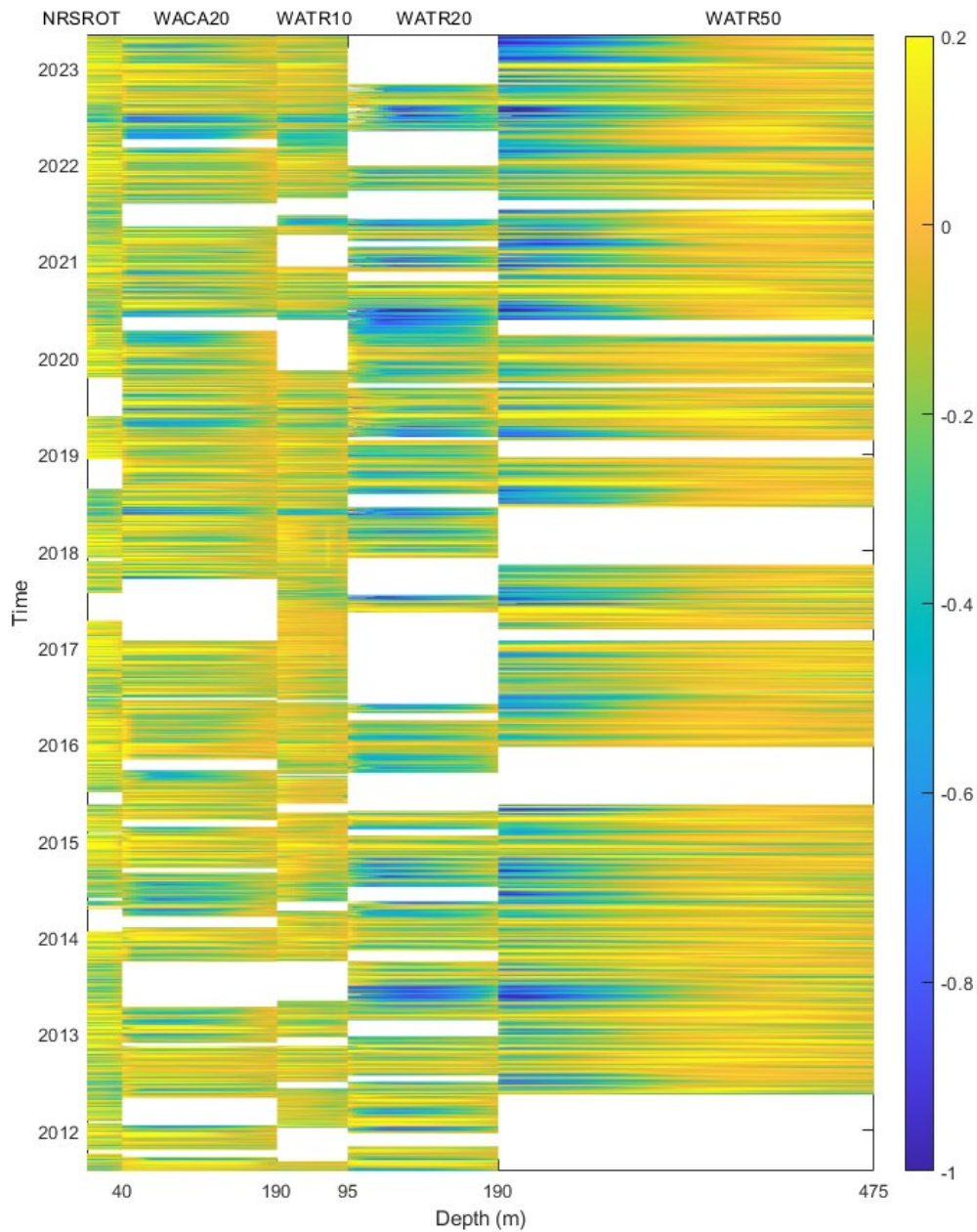
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**Figure S2. Data matrix of gridded daily, 5m-vertical v-velocity-component for the five moorings off the Rottnest shelf. The y axis presents time period from August 2011 to May 2023, while the bottom x axis shows the maximum depth of each moorings. Vertical profiles are NRSROT: 5-40 m; WACA20: 20-190 m; WATR10: 20-95 m; WATR20: 25-190 m and WATR50: 50-475 m. Negative v velocity is southward. Unit in m s$^{-1}$. White space indicates missing observations.**
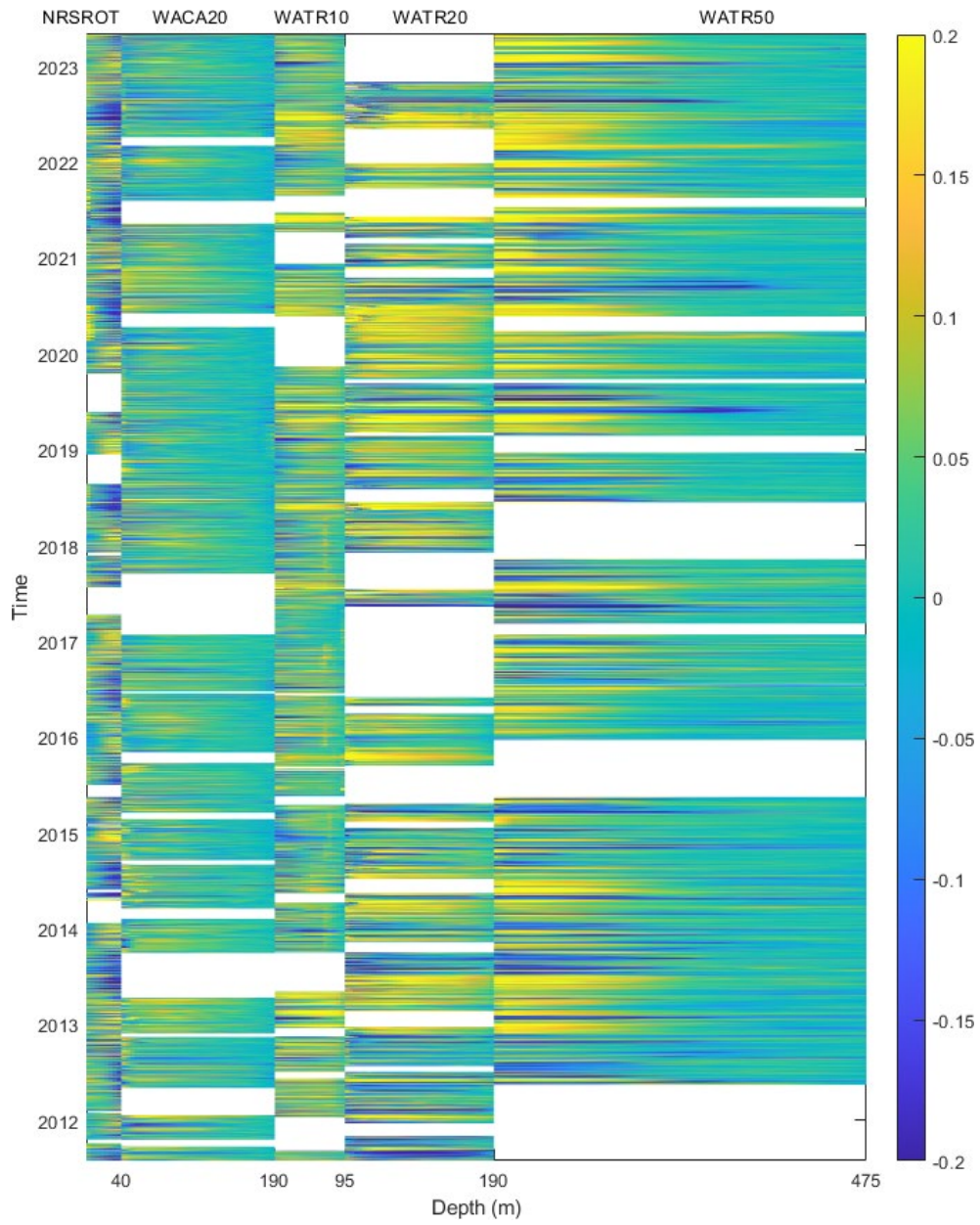
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**Figure S3. As in Figure S2, but for u-velocity component. Negative u velocity is westward (offshore).**
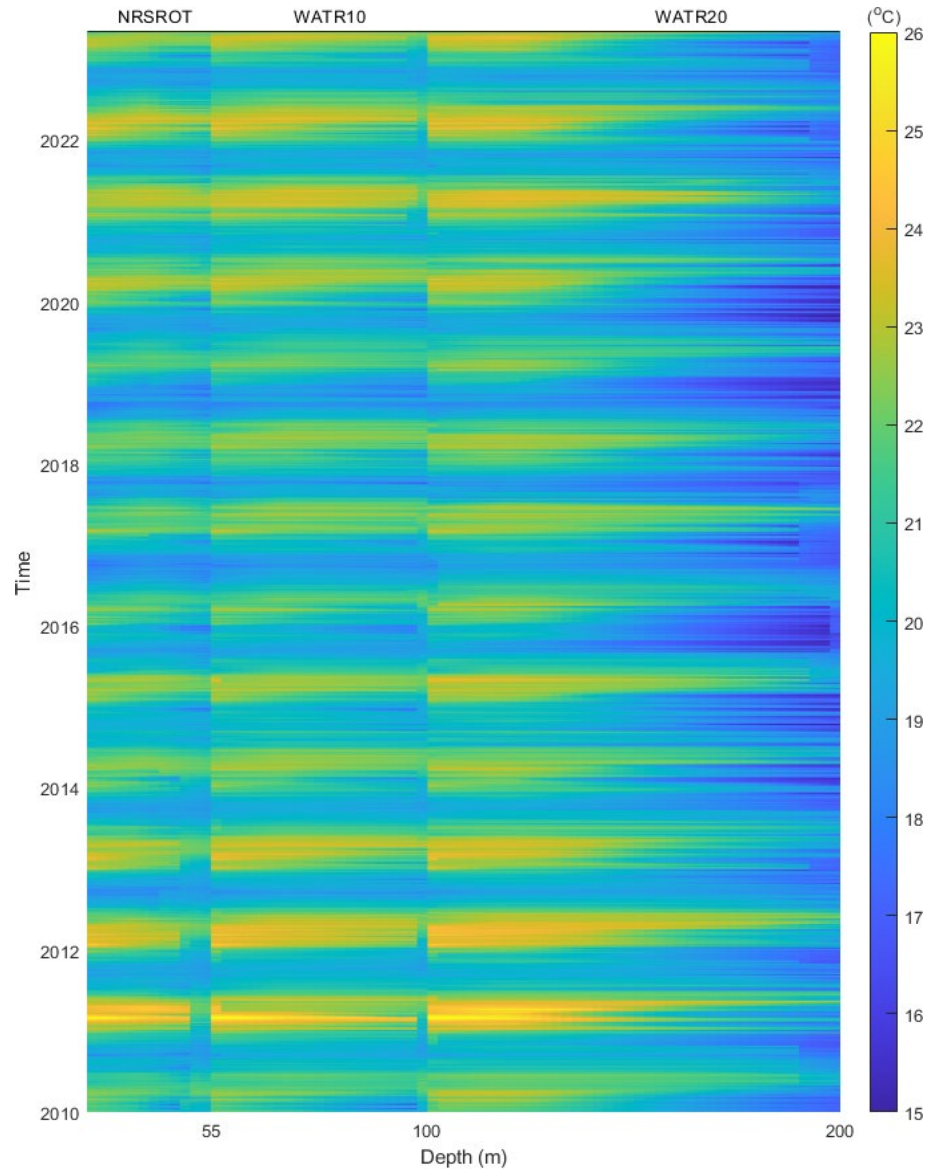
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**Figure S4. Data matrix of daily gridded, 5m resolution gap-filled temperatures for NRSROT, WATR10 and WATR20, but without extrapolating temperatures near the bottom. There were inconsistencies in the vertical temperature profiles near the bottom, for instance the temperatures near the bottom at WATR20 were abnormal warmer during austral winter 2016.**
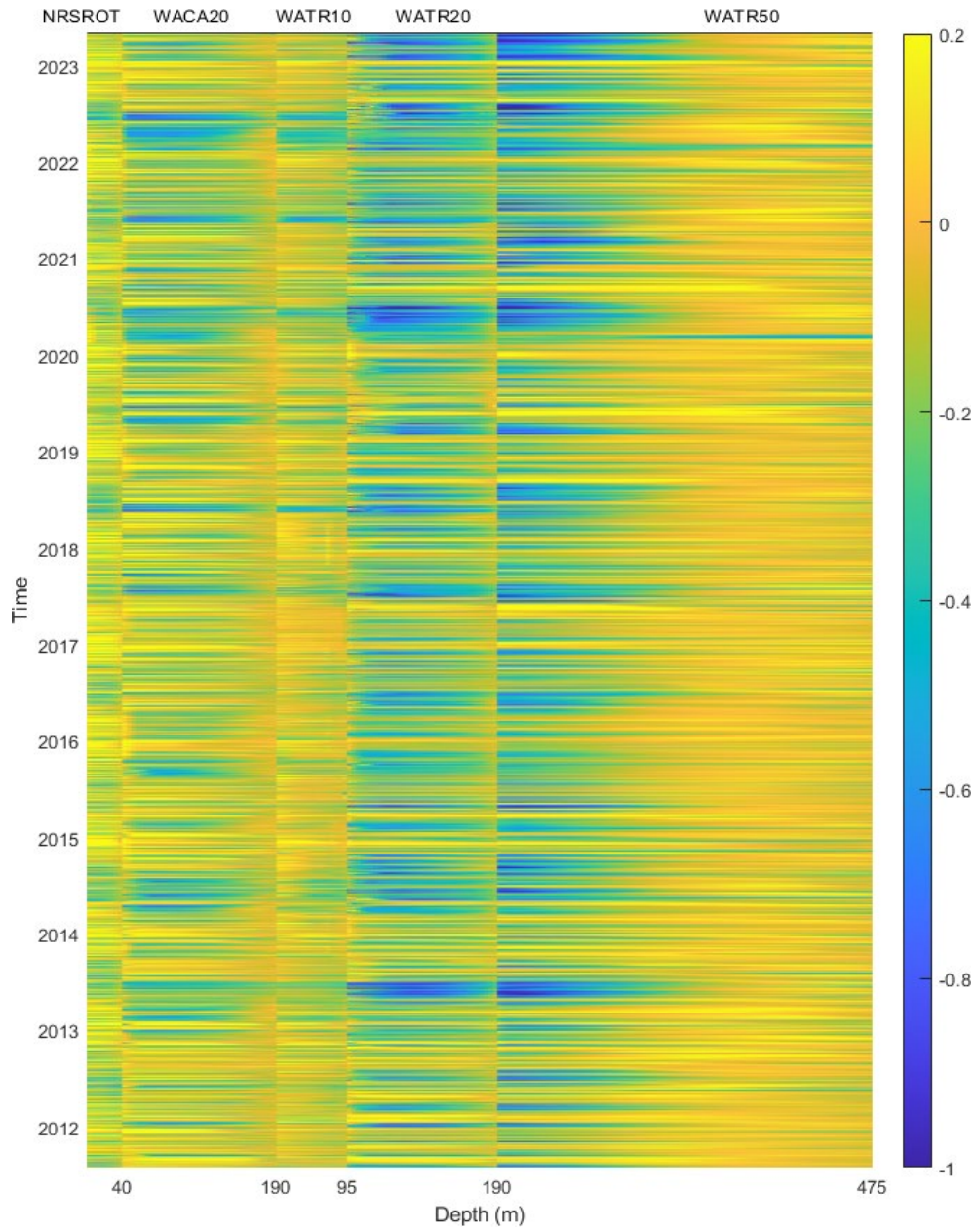
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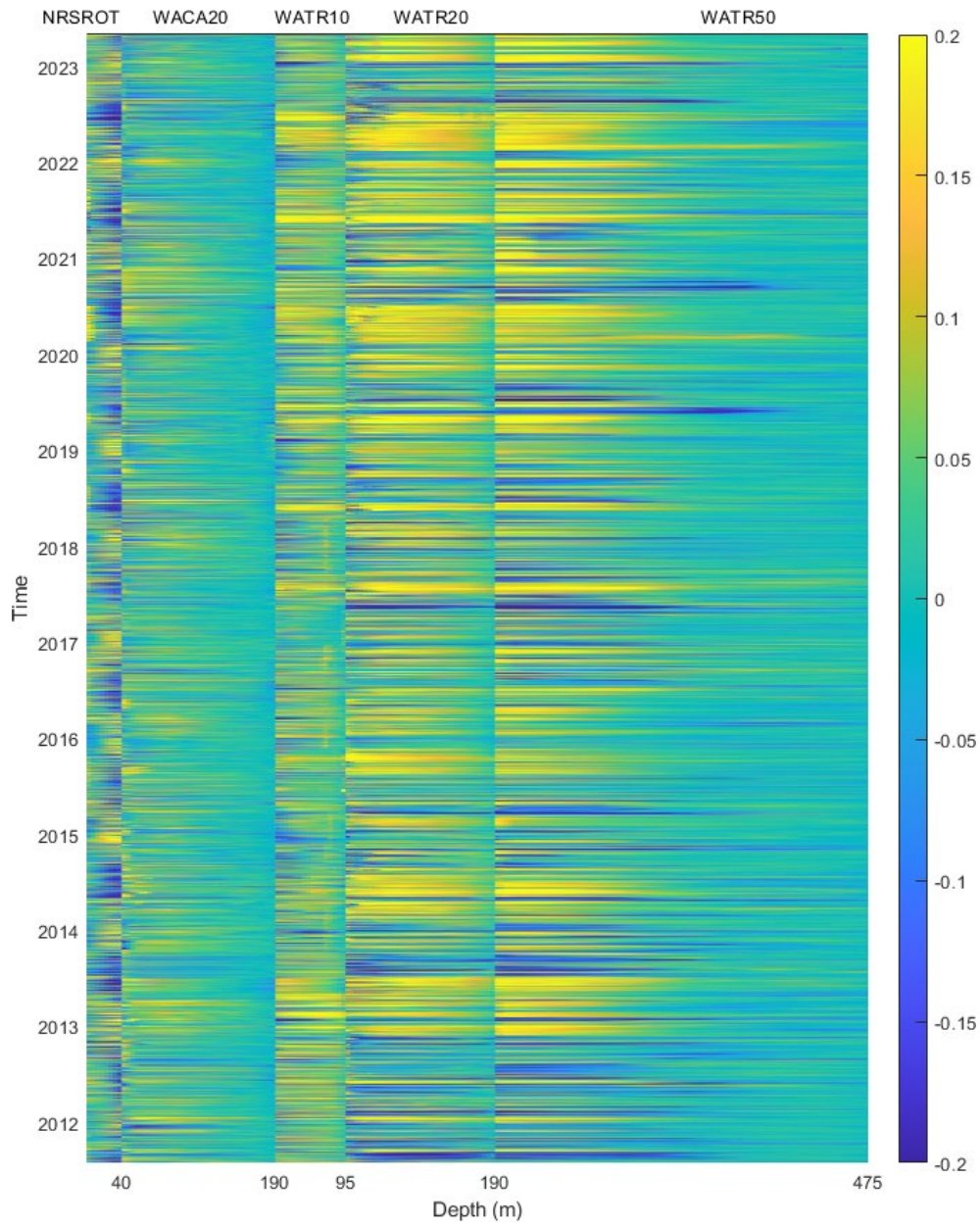**Figure S5. As in Figure S2, but for filled v-velocity-component.**

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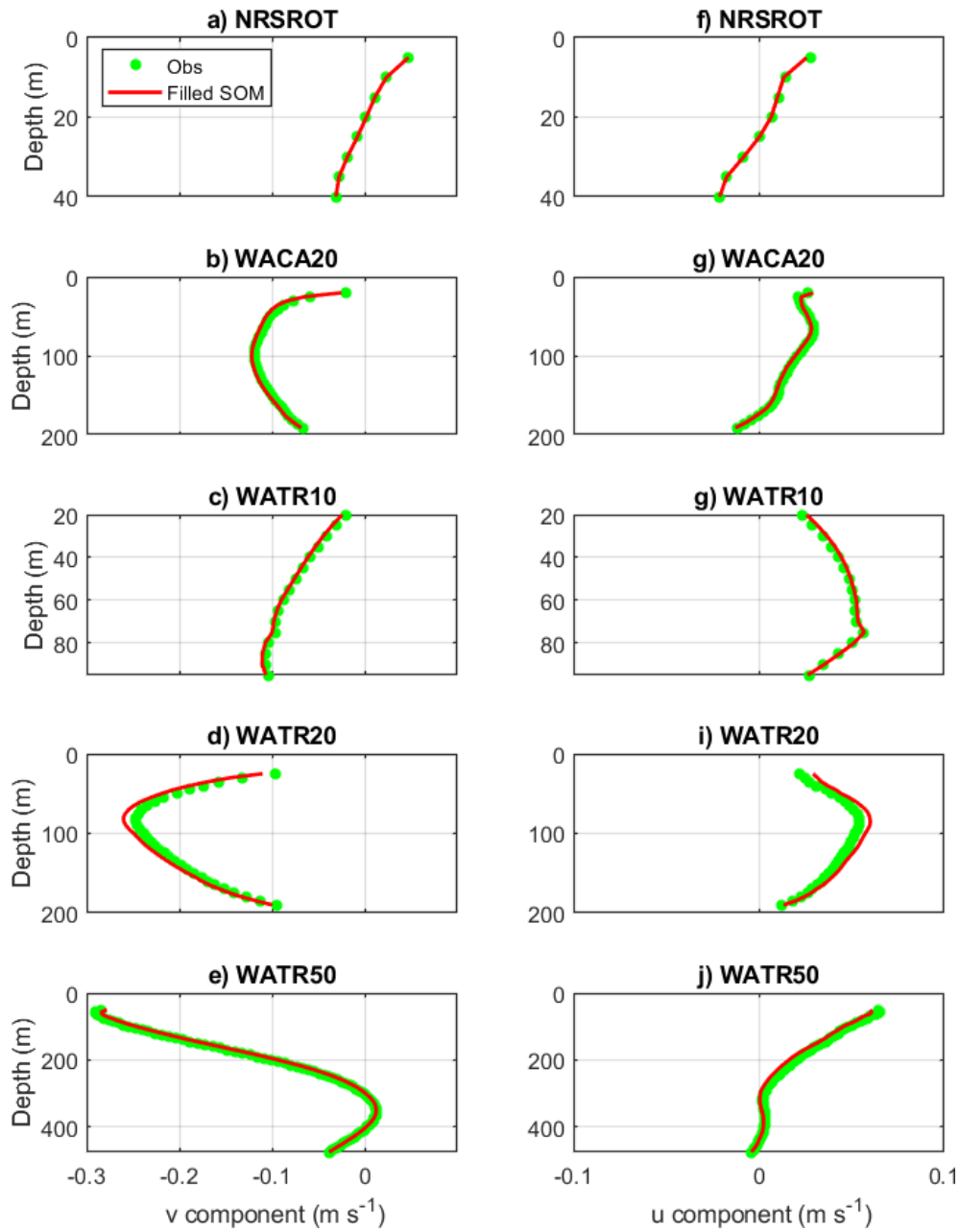**Figure S6. As in Figure S3, but for filled u-velocity-component.**

**Figure S7. Comparison of observed and filled mean vertical profile velocity for a-f) NRSROT, b-g) WACA20, c-g) WATR10, d-i) WATR20 and e-j) WATR50. Left panels show v component, while right panels present u component.**
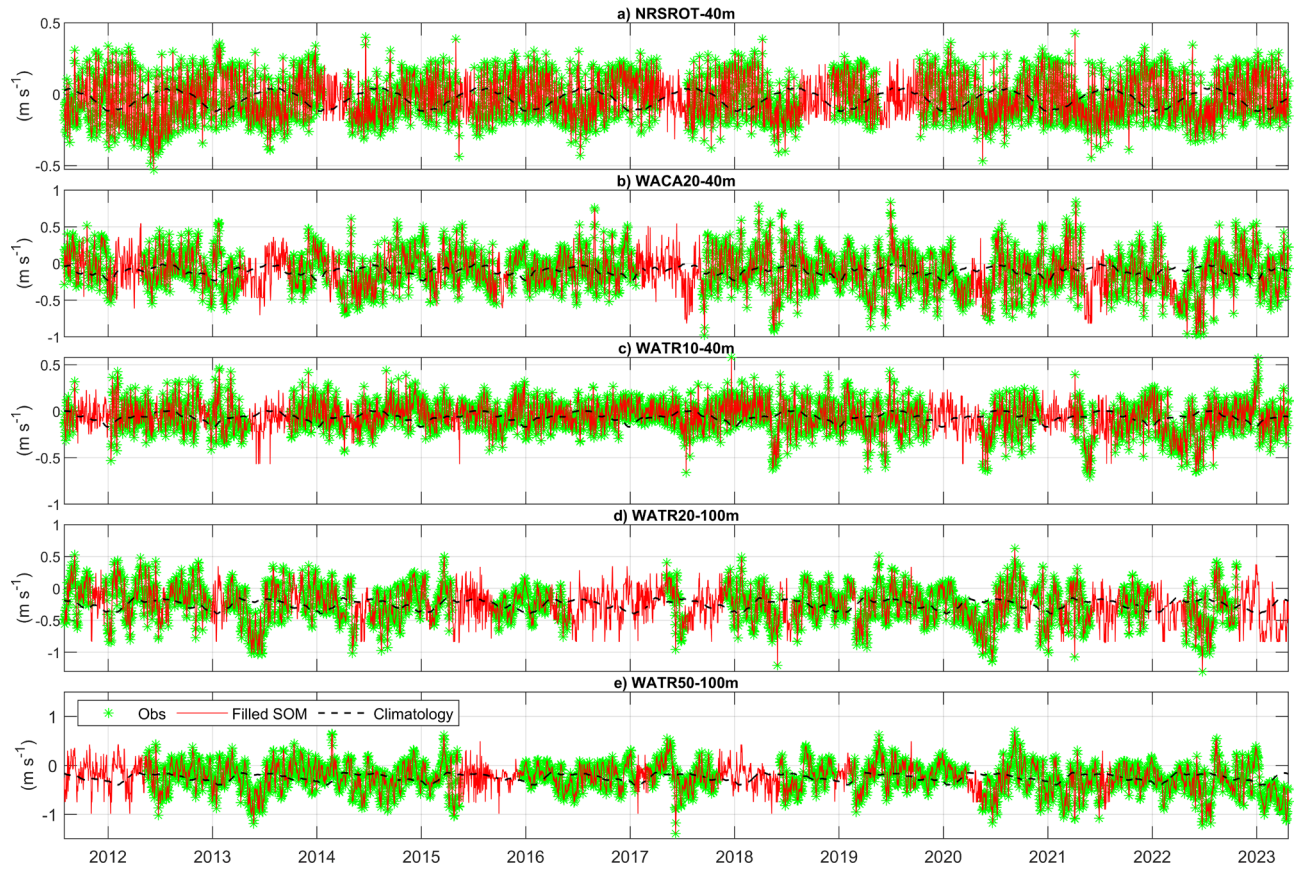
**Figure 1. Comparison of observed and filled v-component timeseries for a) NRSROT at depth of 40m, b) WACA20 at depth of 40m, c) WATR10 at depth of 40m, d) WATR20 at depth of 100m, and e) WATR20 at depth of 100m. The black dashed lines show daily climatological timeseries at the corresponding depths. The climatological values are estimated from filled data.**

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