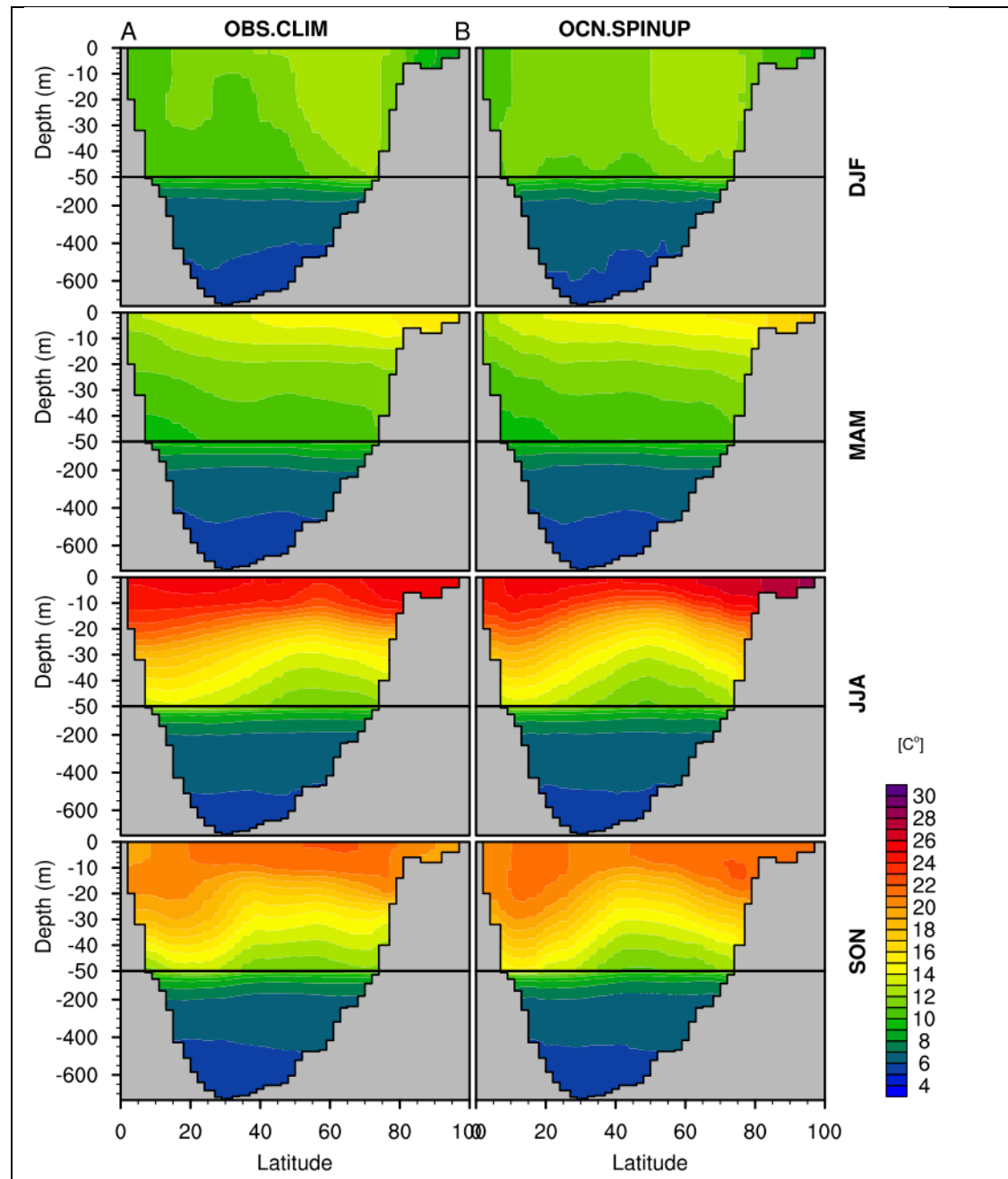
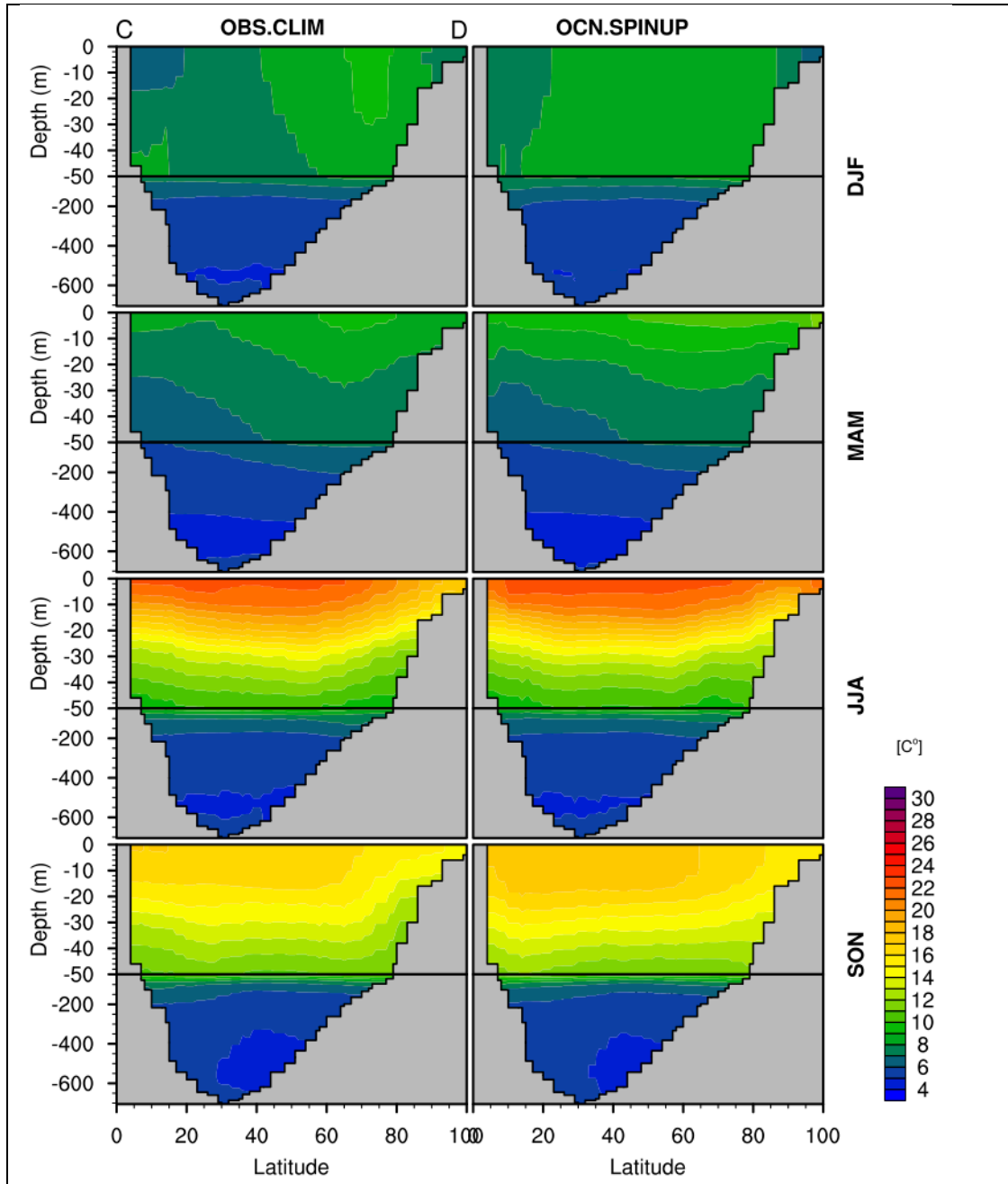


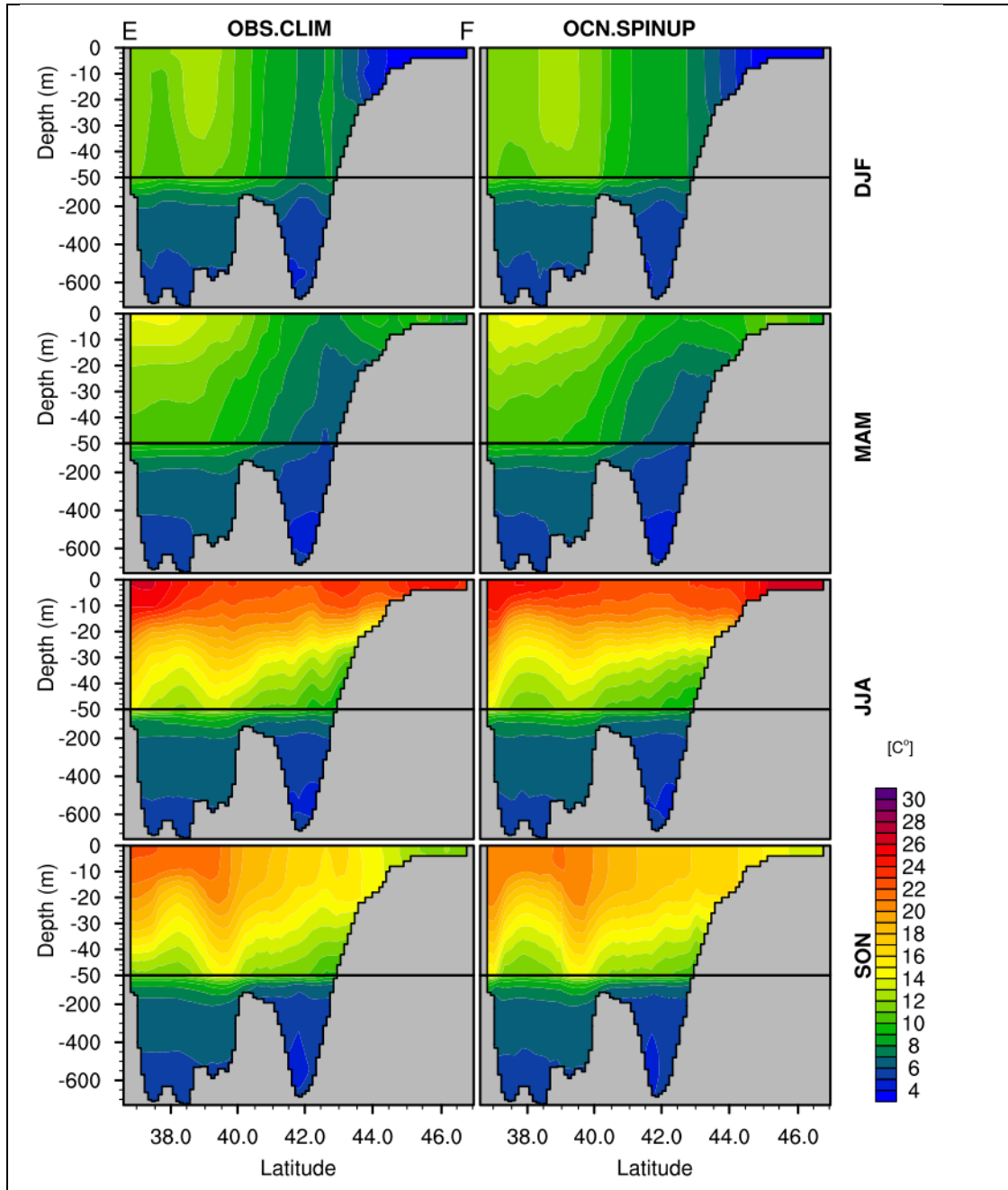
**Supplementary Plots:**



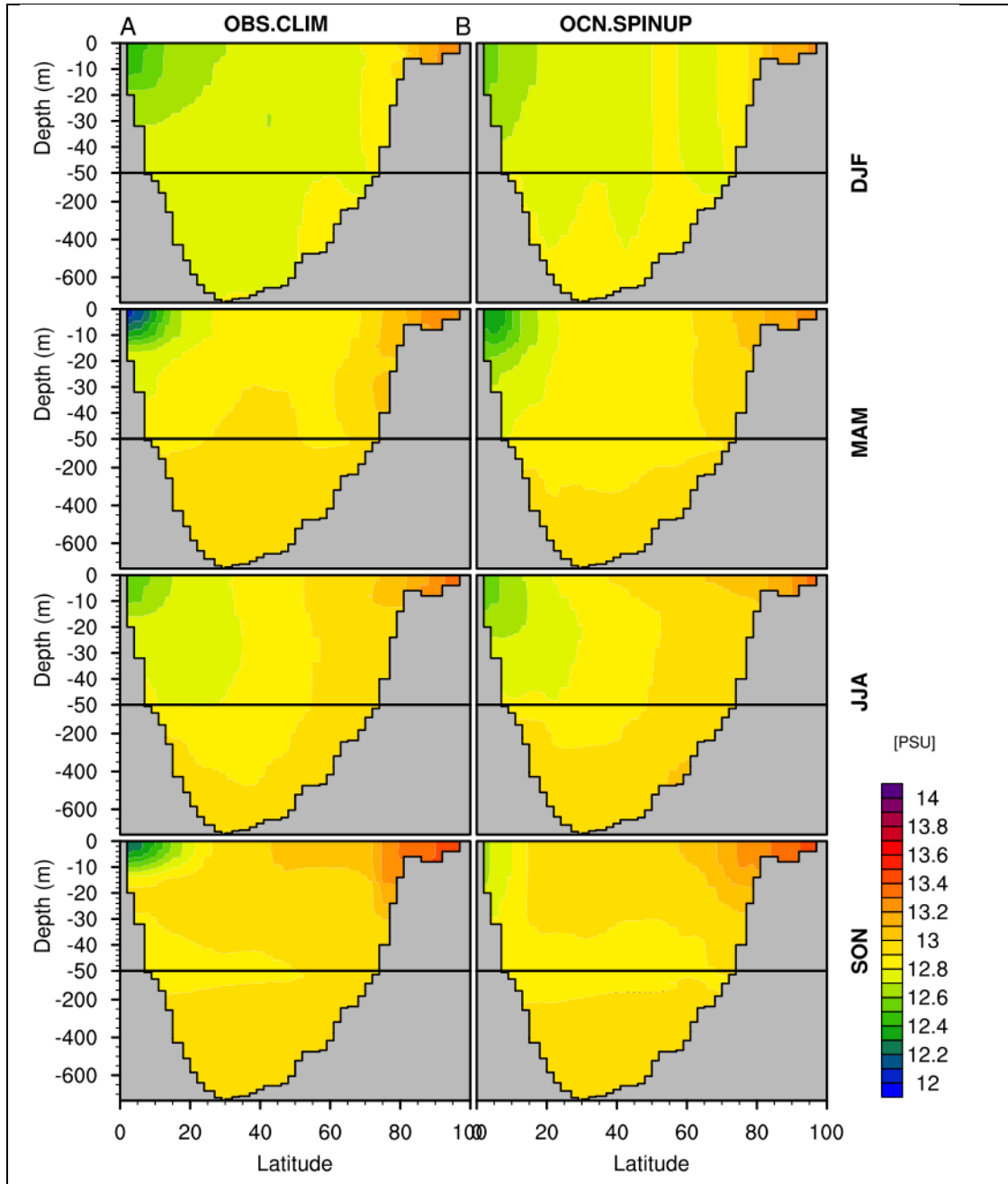
**Figure 1** Vertical cross section (A-B, see Fig.3b in the manuscript) of seasonal temperature climatology of observation (from Ibrayev et al., 2001) and spin-up run (15 yr). Also note that the depth axis is not monotonically increasing (zoomed in to first 50 m).



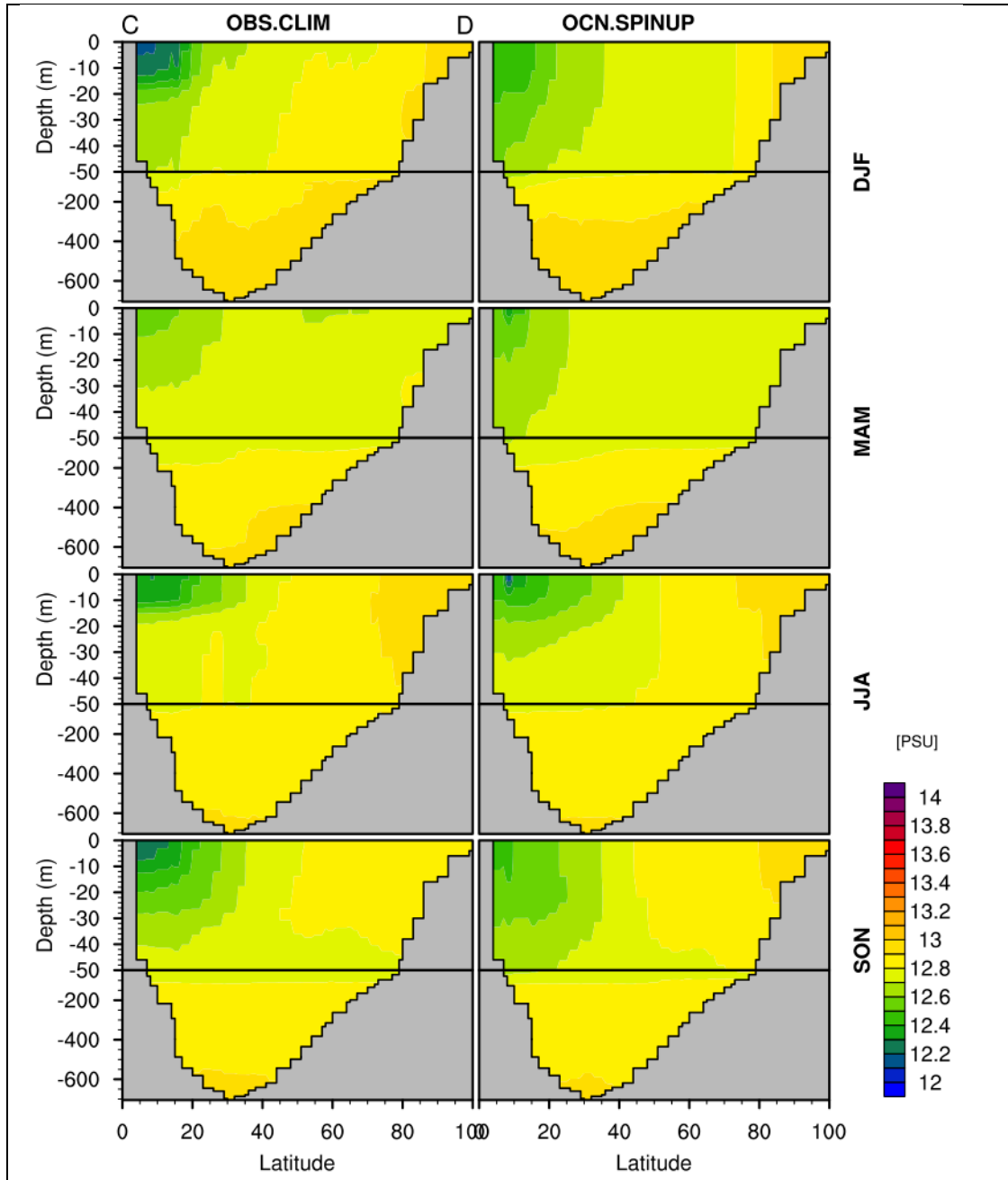
**Figure 2** Same figure with Fig.1 but in this case cross section belongs to C-D direction (see Fig.3b in the manuscript).



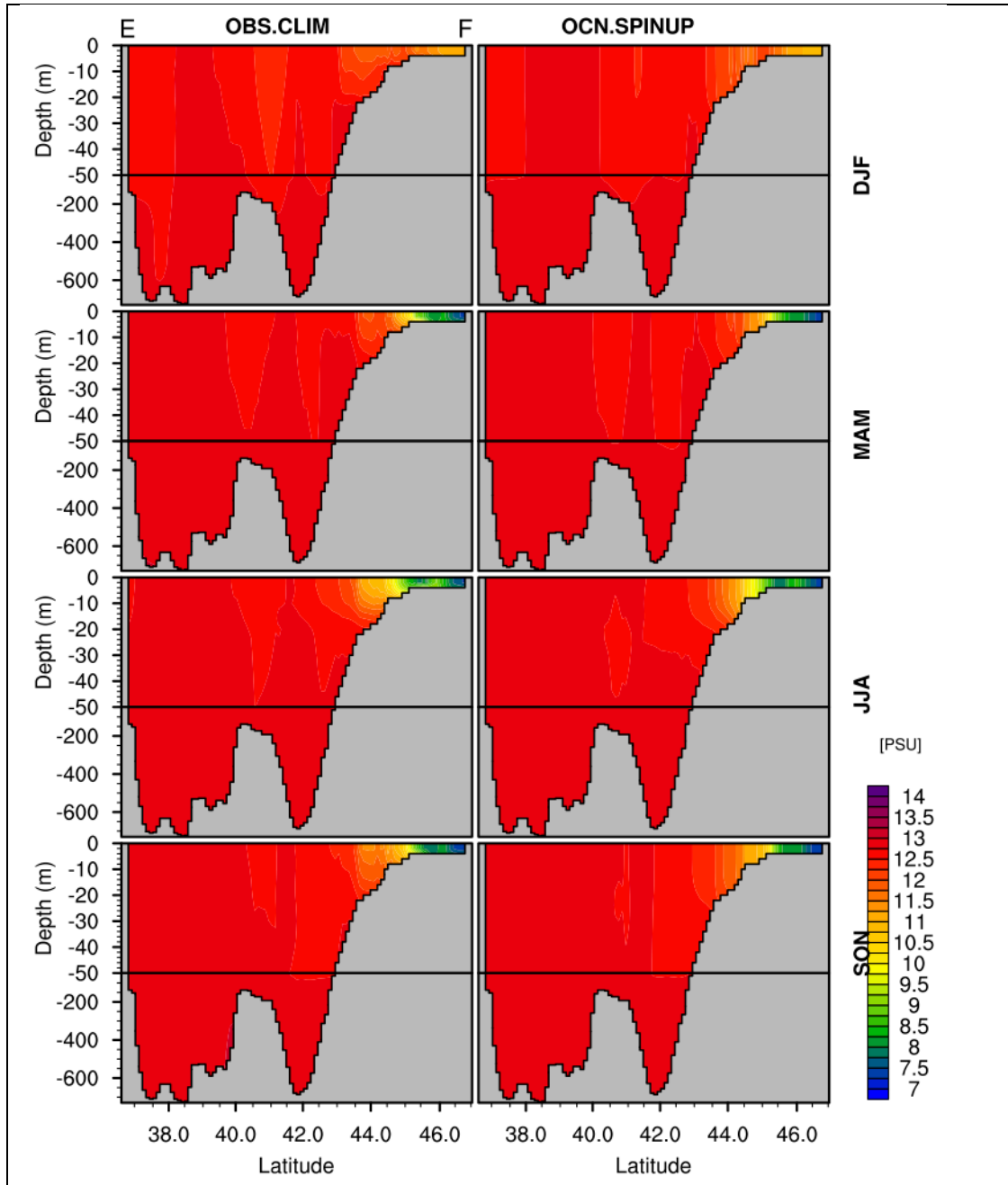
**Figure 3** Same figure with Fig.1 but in this case cross section belongs to C-D direction (see Fig.3b in the manuscript).



**Figure 4** Vertical cross section (A-B, see Fig.3b in the manuscript) of seasonal salinity climatology of observation (from Ibrayev et al., 2001) and spin-up run(15 yr). Also note that the depth axis is not monotonically increasing (zoomed in to first 50 m).



**Figure 5** Same figure with Fig.4 but in this case cross section belongs to C-D direction (see Fig.3b in the manuscript).



**Figure 6** Same figure with Fig.4 but in this case cross section belongs to E-F direction (see Fig.3b in the manuscript).