



*Supplement of*

**Seasonality of meridional overturning in the subpolar North Atlantic:  
density flux as a metric for understanding the Atlantic  
meridional overturning circulation**

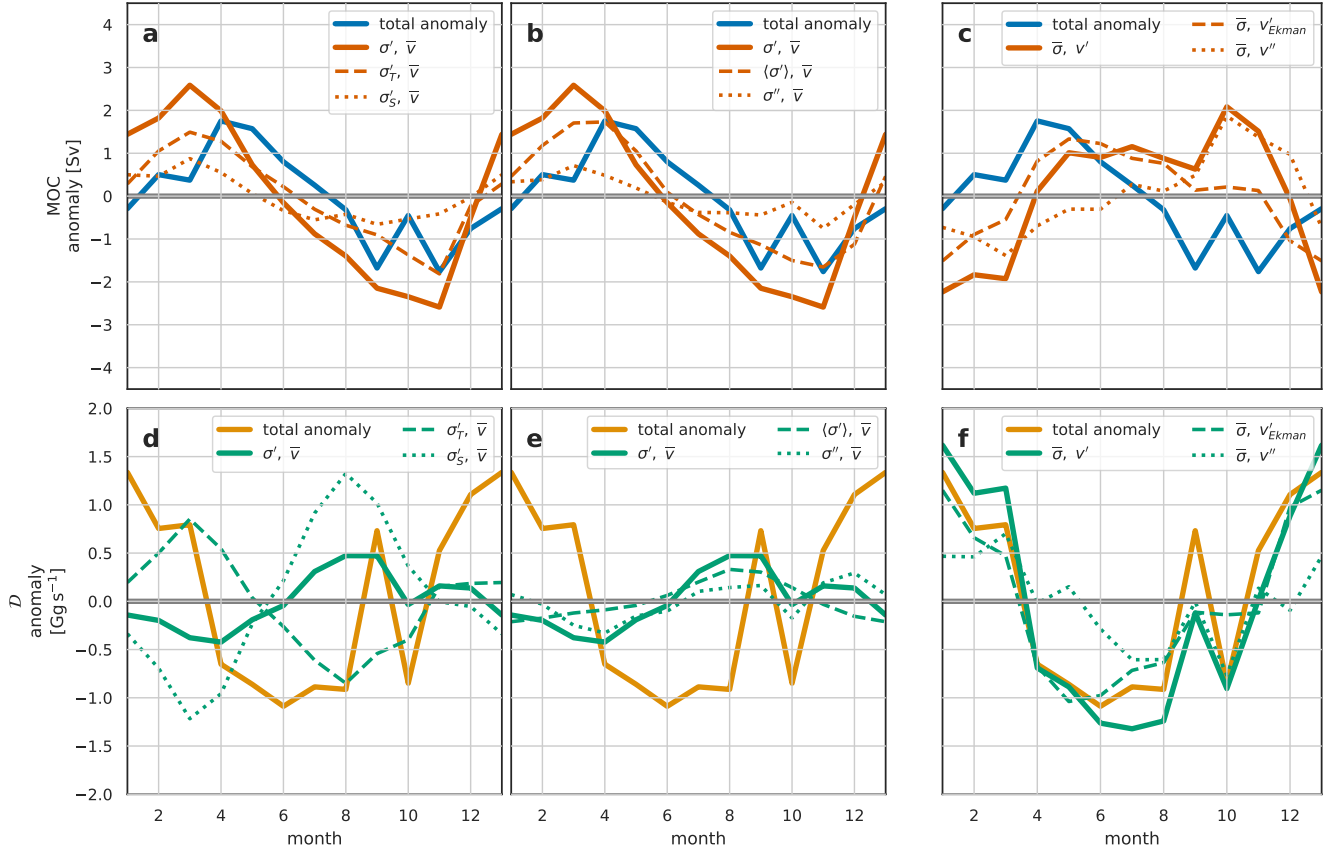
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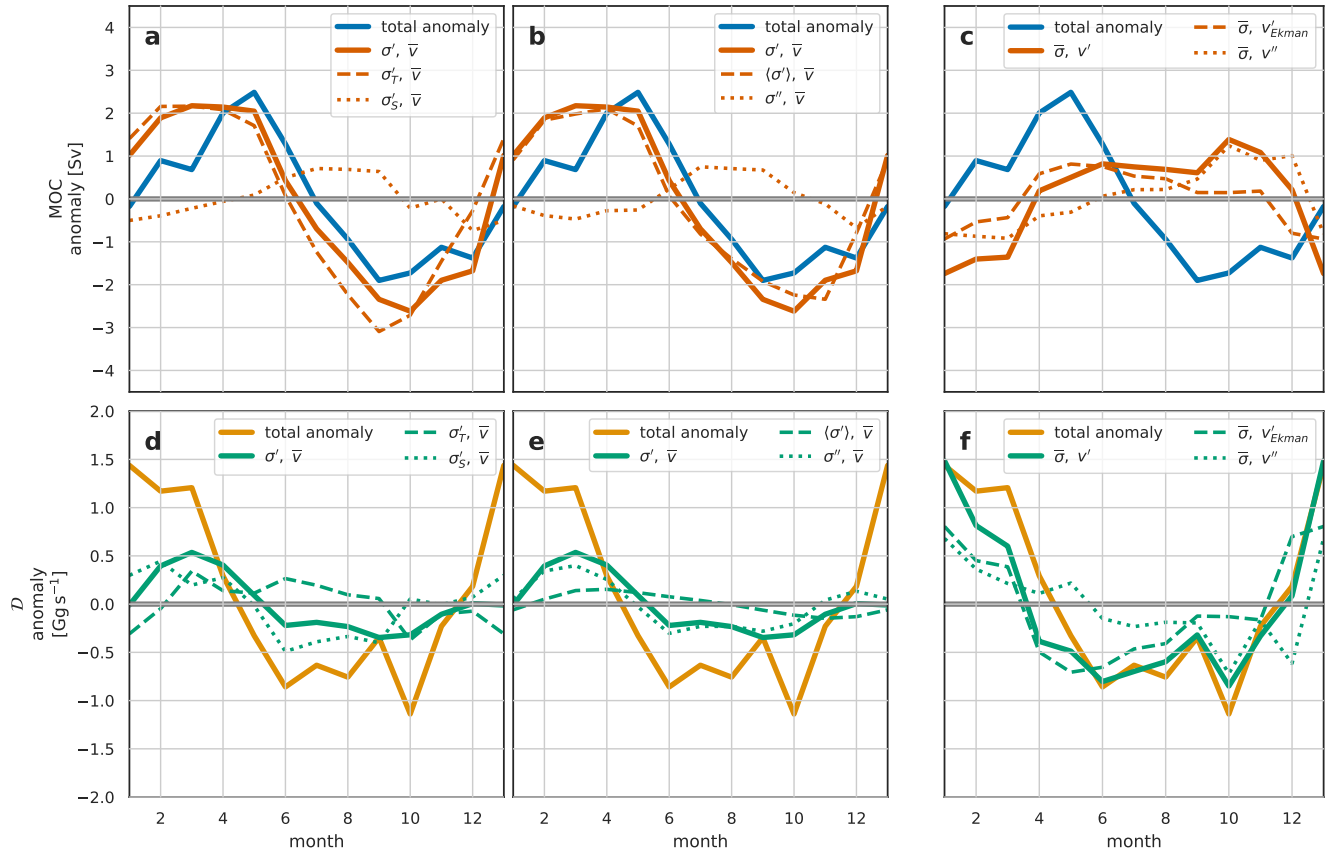
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## Supplementary figures

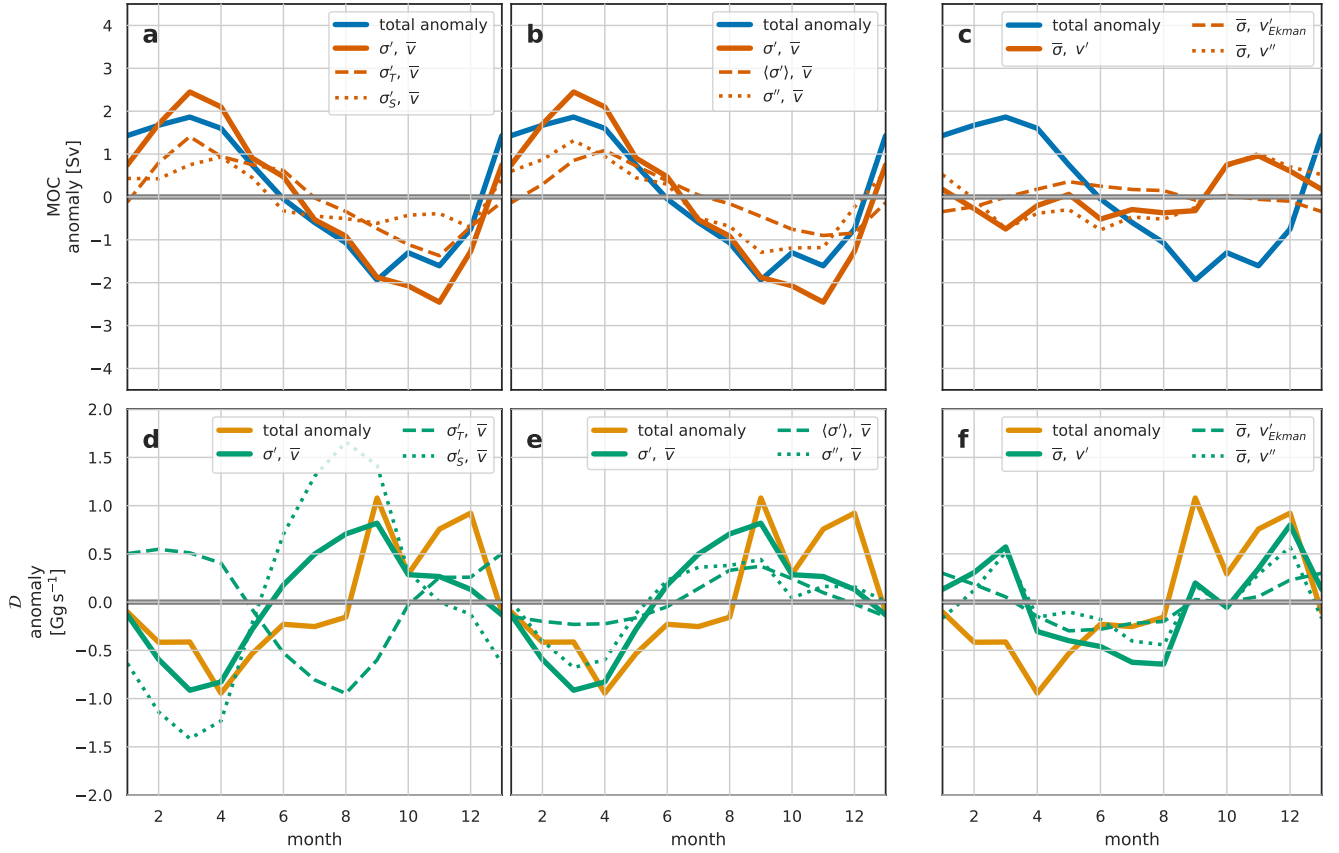
These figures duplicate figures in the main text but are calculations from the Viking20x model based only on the OSNAP 6-year period rather than the longer 20-year run.



**Figure S1.** Summary plot of the decomposition of the seasonal cycle for the full OSNAP section of (a-c)  $MOC_\sigma$  and (d-f) density flux  $\mathcal{D}$  for the **6-year, 2014 – 2020, run of the Viking20x model** (see main text Fig. 8 for the 20-year equivalent). The left-hand column (a,d) shows the density-driven decomposition into temperature and salinity components; the middle column the density-driven decomposition into zonal mean and remainder; and the right-hand column the velocity-driven decomposition into Ekman and remainder components. The blue line repeated in (a-c) is the total  $MOC_\sigma$  anomaly; the solid orange line is either the total density-driven anomaly component of  $MOC_\sigma$  (a,b), or the total velocity-driven component (c). The dashed and dotted lines in (a-c) are respectively: in (a) the temperature and salinity driven components; in (b) the zonal mean density and density-driven remainder components; and in (c) the Ekman driven and velocity-driven remainder components. Similarly, for (d-f) the repeated yellow line is the total  $\mathcal{D}$  anomaly; the solid green line is either the total density-driven anomaly component of  $\mathcal{D}$  (d,e), or the total velocity-driven component (f). The dashed and dotted lines in (d-f) are respectively: in (d) the temperature and salinity driven components; in (e) the zonal mean density and density-driven remainder components; and in (f) the Ekman driven and velocity-driven remainder components. Several of the figures following share this format so it is worth spending a moment to understand it.



**Figure S2.** As fo Fig S1 but for the **6-year, 2014 – 2020, Viking20x model** seasonal cycle at OSNAP<sub>E</sub> (see main text Fig. 9 for the 20-year equivalent).



**Figure S3.** As fo Fig S1 but for the **6-year, 2014 – 2020, Viking20x model** seasonal cycle at OSNAP<sub>W</sub> (see main text Fig. 10 for the 20-year equivalent)