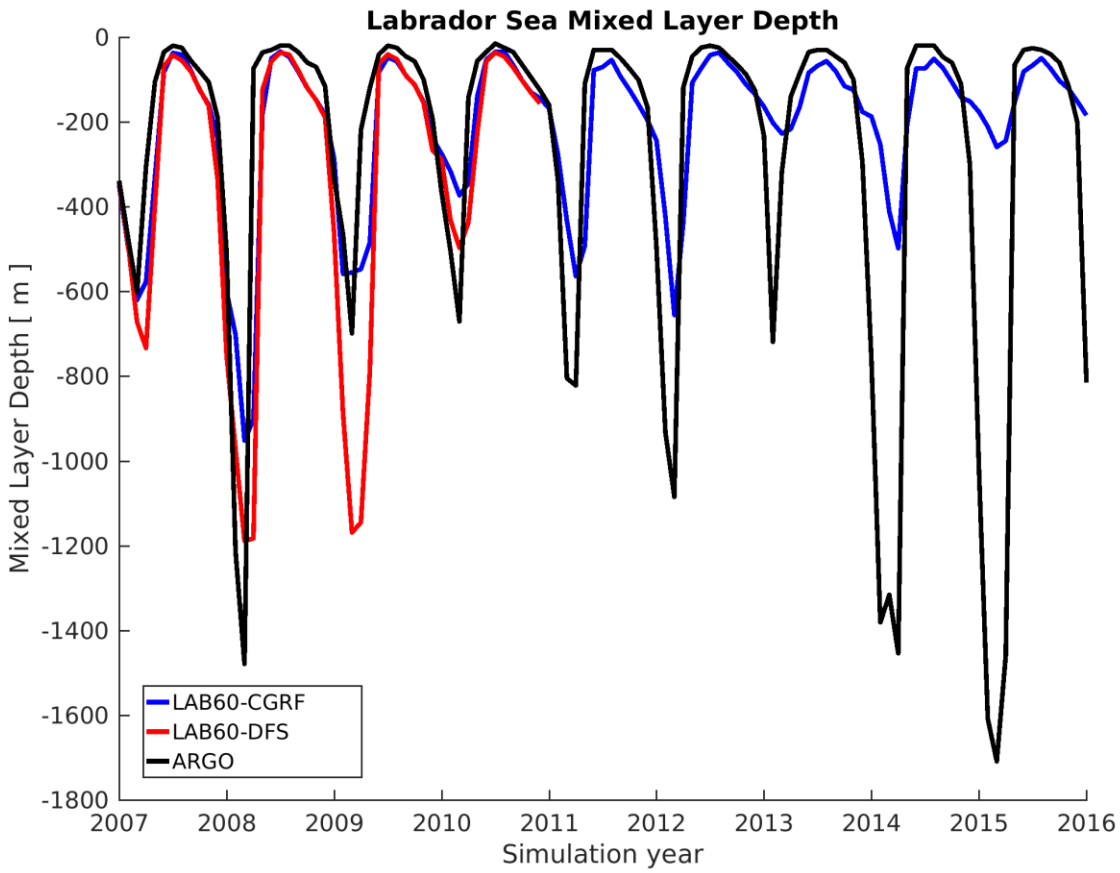

Supplemental Figure 1: Monthly mixed layer depth as determined by the LAB60-CGRF simulation, the LAB60-DFS simulation, and ARGO observations from 2007 to the end of 2016. This figure highlights the justification that the CGRF forcing was inadequate to force LAB60, prompting us to restart the run in 2007 using the DFS forcing.

Supplemental Video 1: Relative vorticity of the LAB60 simulation, from 1 Jan 2004 through 31 Dec 2010. Units are in s^{-1}. Note a few days are missing due to corrupted output files. DOI: https://doi.org/10.7939/r3-2yts-nw62

Supplemental Video 2: Convective energy of the LAB60 simulation, with a reference depth of 2000m. Video takes place from 1 Jan 2004 through 31 Dec 2010. Units are in J m^{-3}. Note a few days are missing due to corrupted output files. DOI: https://doi.org/10.7939/r3-nen0-g831

Supplemental Video 3: Mixed layer depth, in meters, of the LAB60 simulation from 1 Jan 2004 through 31 Dec 2010. Note a few days are missing due to corrupted output files. DOI: https://doi.org/10.7939/r3-m6rk-h867

Supplemental Video 4: Greenland melt passive tracer, in meters, of the LAB60 simulation. Video takes place from 1 Jan 2004 though 31 Dec 2010. Note a few days are missing due to corrupted output files. DOI: https://doi.org/10.7939/r3-43mg-db88

Supplemental Video 5: Irminger water passive tracer, in meters, of the LAB60 simulation. Video takes place from 1 Jan 2004 through 31 Dec 2010. Note a few days are missing due to corrupted output files. DOI: https://doi.org/10.7939/r3-zwkr-0w35

Supplemental Video 6: Labrador Sea water tracer, in meters, of the LAB60 simulation. Video takes place from 1 Jan 2004 through 31 Dec 2010. Note a few days are missing due to corrupted output files. DOI: https://doi.org/10.7939/r3-7295-ks15