Labrador Sea sub-surface density as a precursor of multi-decadal variability in the North Atlantic: a multi-model study

Pablo Ortega$^{1,2}$, Jon Robson$^1$, Matthew Menary$^3$, Rowan Sutton$^1$, Adam Blaker$^4$, Agathe Germe$^4$, Jöel Hirschi$^4$, Bablu Sinha$^4$, Leon Hermanson$^5$ and Stephen Yeager$^6$

$^1$NCAS, University of Reading, Reading, UK
$^2$Barcelona Supercomputing Center, Barcelona, Spain
$^3$LOCEAN, Sorbonne Universités
$^4$National Oceanography Centre, European Way, Southampton, SO14 3ZH, UK
$^5$Met Office Hadley Centre, Exeter, UK
$^6$National Center for Atmospheric Research, Boulder, USA

Correspondence to: Pablo Ortega (pablo.ortega@bsc.es)

Supplementary Figures
Supplementary Figure 1: a Lead-lag correlations across the picontrol ensemble between PC1-LSD and the maximum AMOC streamfunction at 45°N after the Ekman transport is removed (AMOC45). Correlations are based on 10-year running trends. For positive lags, PC1-LSD leads. Significance is assessed as in Figure 2d and indicated with a circle. b The same as in a but for dLSD index. c-h The same as in a-b but with respect to the AMOC26 (without the Ekman component), the SPGSI and ESPNA-T700 indices, respectively.
Supplementary Figure 2: a Scatterplot of the maximum correlations at any lag between PC1-LSD and AMOC26N (without the Ekman component) against the climatological mean of the Labrador Sea Density stratification index (computed as the difference of the vertical means in the levels 0-50 m minus the vertical means in the levels 400-500 m; see Fig. 1). The maximum correlations are based on 10-year running trends. The correlation coefficient between the two metrics is shown in the top-left corner. The presence of an asterisk indicates that the correlation is significant at the 95% confidence level. Colors indicate the lag at which the maximum correlation between PC1-LSD and AMOC26 is obtained. The grey vertical lines depict the mean stratification value in the DePreSys3 assimilation run for the reference period 1960-2013. b-c The same as in a but for stratification indices defined between the levels 0-100 m vs 500-1000 m and 0-200 m vs 1000-2000 m, respectively.