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Climate impacts on multidecadal pCO_2 variability in the North Atlantic: 1948–2009

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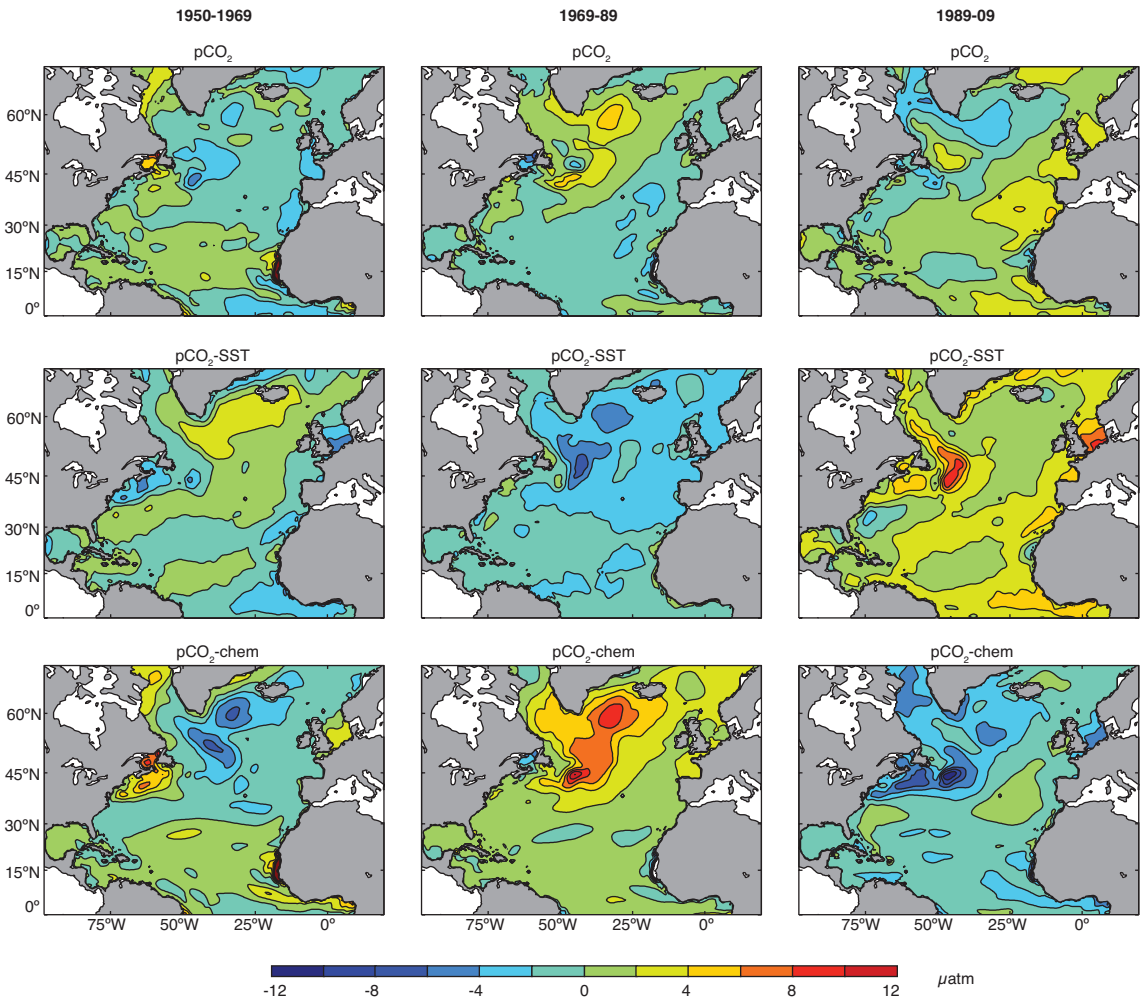

Figure S1: 20-year mean anomalies with respect to the 1948-2009 average for: a-c) pCO_2, d-f) pCO_2-SST, g-i) pCO_2-chem.

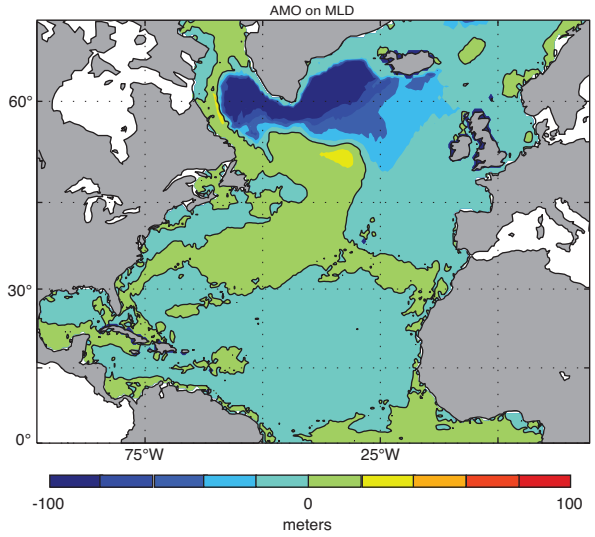

Figure S2: Regression of AMO on Mixed Layer Depth (MLD). Negative values denote a shoaling of MLD.

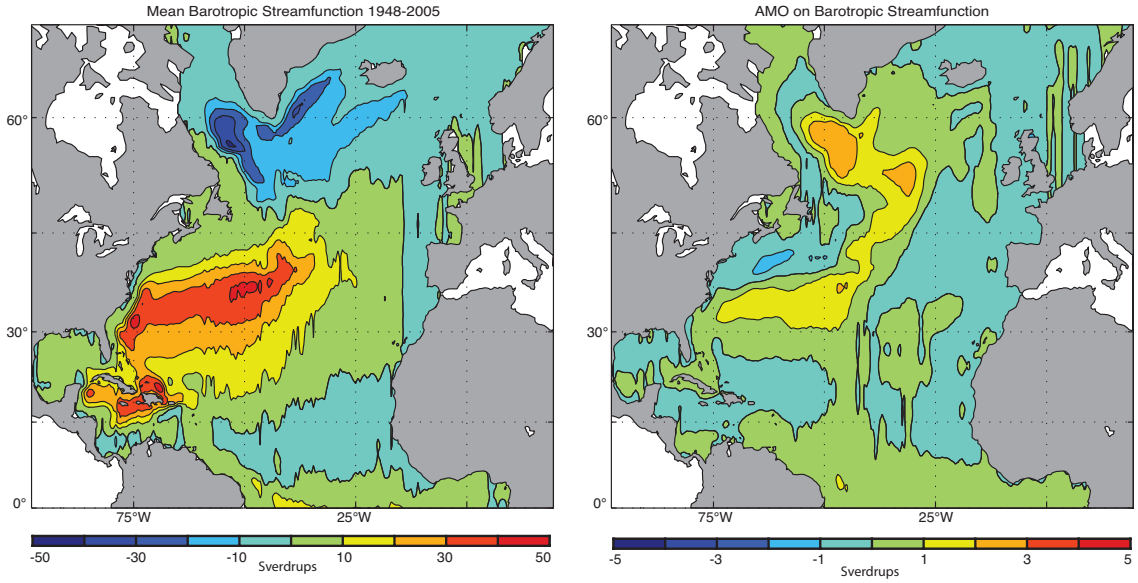

Figure S3: a) 1948-2005 mean barotropic streamfunction and b) AMO regressed onto barotropic streamfunction anomalies. Positive values denote clockwise motion. Units: Sverdrups (1 Sv = 10^6 m^3*s^{-1}).

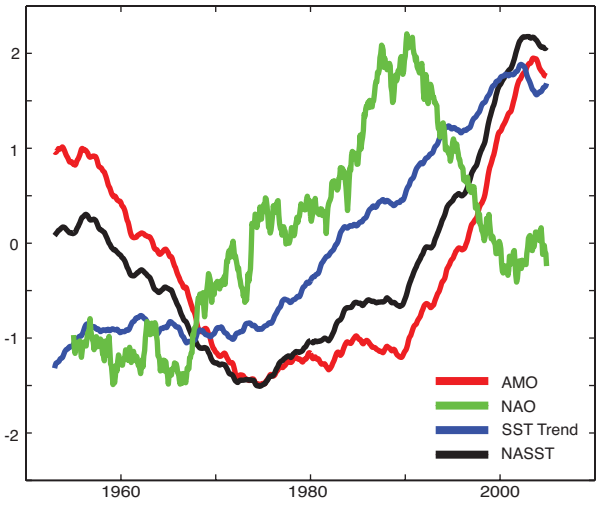

Figure S4: Same indices as in Figure 1d, as well as 121-month smoothed, standardized NAO index from NOAA ESRL (http://www.esrl.noaa.gov/psd/data/climateindices/list/).

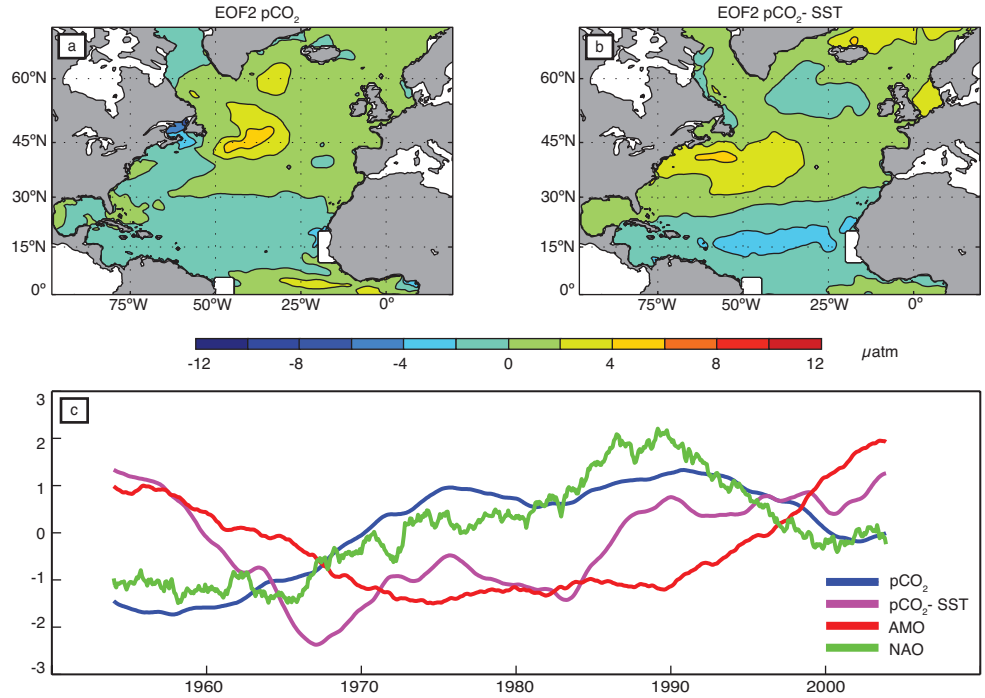

Figure S5: a) EOF2 of total pCO_2 (µatm), b) EOF2 of pCO_2-SST (µatm), explaining 13% and 12% of total variance, respectively. c) PC2- pCO_2 (blue), PC2-pCO_2-SST (pink), AMO index (red), and NAO index (green). Timeseries are smoothed with a 121-month box smoother.

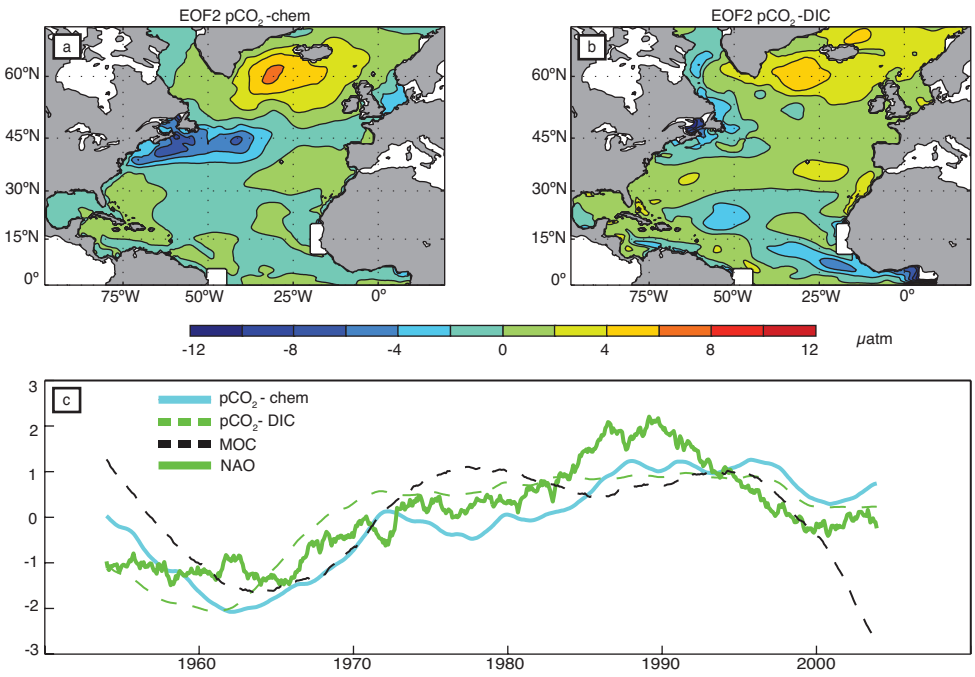

Figure S6: a) EOF2 pCO_2-chem (µatm), b) EOF2 pCO_2-DIC (µatm), each explaining 14% of total variance of each respective field. c) PC2- pCO_2-chem (cyan), PC2- pCO_2-DIC (green dash), NAO index (green), the modeled maximum Meridional Overturning Circulation at 45°N (MOC, black dash), all standardized. Timeseries are smoothed with a 121-month box smoother.

	PC1-pCO_2	PC1-pCO_2-SST	PC1-pCO_2-chem	PC1-pCO_2-DIC	SST	AMO	SST Trend	NAO	MOC
PC1-pCO_2	**1.0**	**0.91**	**0.66**	**0.67**	**0.88**	**0.61**	**0.94**	**0.23**	0.0026
PC1-pCO_2-SST		**1.0**	**0.90**	**0.91**	**1.0**	**0.86**	**0.78**	-0.069	**-0.12**
PC1-pCO_2-chem			**1.0**	**0.98**	**0.92**	**0.99**	**0.45**	**-0.42**	**-0.25**
PC1-pCO_2-DIC				**1.0**	**0.93**	**0.96**	**0.49**	**-0.38**	**-0.18**
SST					**1.0**	**0.90**	**0.74**	**-0.11**	**-0.13**
AMO						**1.0**	**0.37**	**-0.49**	**-0.32**
SST Trend							**1.0**	**0.51**	**0.21**
NAO								**1.0**	**0.57**
MOC									**1.0**

Table S1: Correlation between first principle components of the EOFs for pCO_2 and its components, climate indices, and the modeled maximum Meridional Overturning Circulation (MOC) at 45^{o}N. Index and MOC correlations are also shown. Bold indicates significance at the 95% level.

	PC2-pCO_2-	PC2-pCO_2-SST	PC2-pCO_2-chem	PC2-pCO_2-DIC	SST	AMO	SST Trend	NAO	MOC
PC2-pCO_2-	**1.0**	0.080	**0.80**	**0.96**	**-0.18**	**-0.59**	**0.50**	**0.89**	**0.56**
PC2-pCO_2-SST		**1.0**	**0.52**	-0.039	**0.70**	**0.60**	**0.57**	**0.18**	**0.37**
PC2-pCO_2-chem			**1.0**	**0.82**	**0.28**	**-0.11**	**0.75**	**0.82**	**0.65**
PC2-pCO_2-DIC				**1.0**	**-0.12**	**-0.51**	**0.52**	**0.83**	**0.51**

Table S2: Correlation between second principle components of the EOFs for pCO_2 and its components, climate indices, and MOC. Bold indicates significance at the 95% level.