Supporting Information for "Are mid-20th century forced changes in North Atlantic hurricane potential intensity detectable?"

L. Trenary[1,2], T. DelSole[1,2], S.J. Camargo[3], and M.K. Tippett[4]

[1]George Mason University, Fairfax, Virginia, USA

[2]Center of Land-Ocean-Atmosphere Studies, Fairfax, Virginia, USA.

[3]Lamont-Doherty Earth Observatory, Columbia University, Palisades, New York, USA.

[4]Department of Applied Physics and Applied Mathematics, Columbia University, New York, New York, USA.

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Laplacian Eigenvectors The PI fields are projected onto the eigenvectors of the Laplacian operator over the tropical North Atlantic basin. The resulting spatial patterns for Laplacian eigenvectors 1-4 are shown in figure A1. Note that masked areas are shown in white and that this same mask is applied to both model output and reanalysis data. Details of the methodology can be found in (DelSole & Tippett, 2015).

References

DelSole, T., & Tippett, M. K. (2015). Laplacian eigenfunctions for climate analysis. *J. Clim.*, *28*(18), 7420–7436. Retrieved from https://doi.org/10.1175/JCLI-D-15-0049.1 doi: 10.1175/JCLI-D-15-0049.1

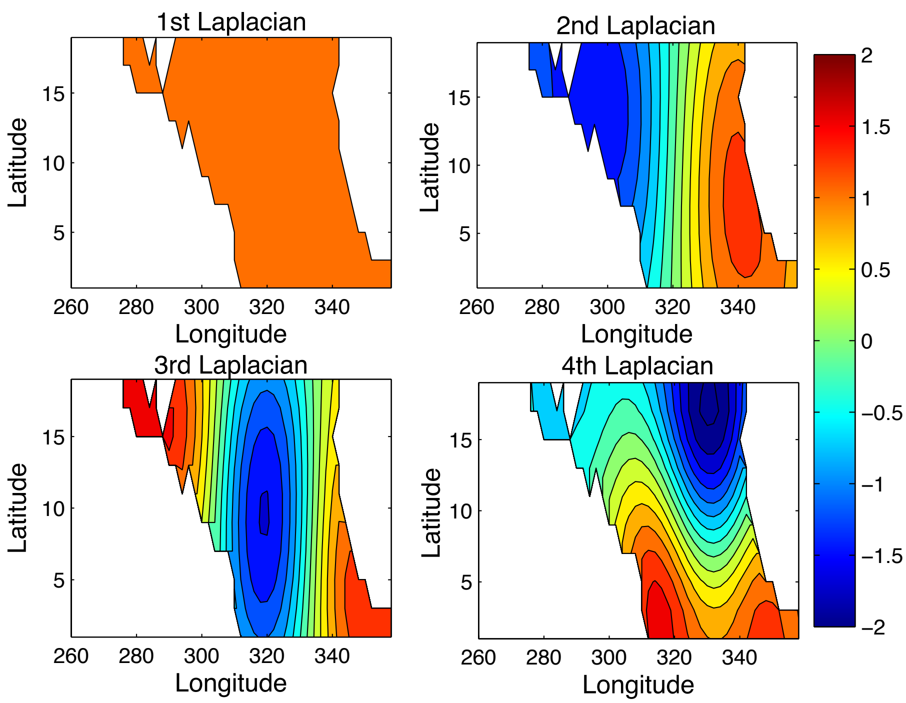

Figure S1. Map showing the leading (a) 1st, (b) 2nd, (c) 3rd and (d) 4th Laplacian eigenvectors for the tropical North Atlantic. The masked regions, shown in white, are consistent across all analyzed datasets.

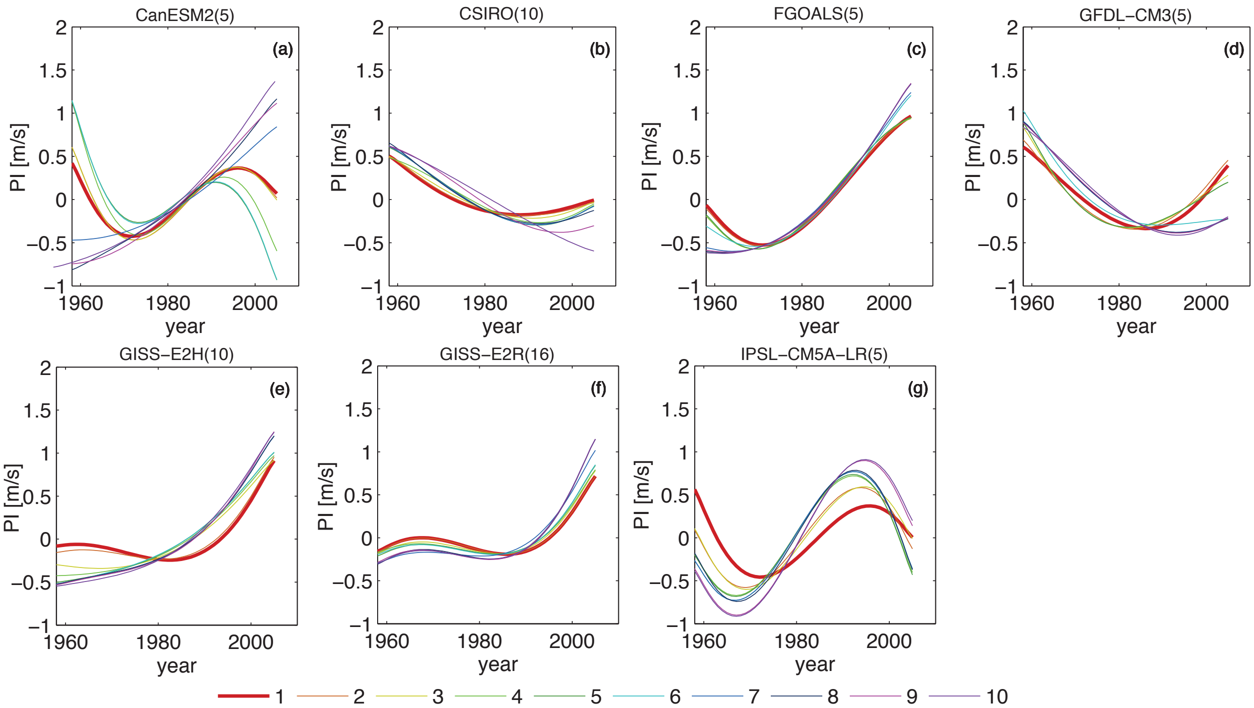

Figure S2. Time series of the leading discriminant for the seven climate models that detect a forced response in tropical North Atlantic PI. The thick red curve shows the basin mean tropical North Atlantic PI anomalies (i.e. the 1st Laplacian). The thin colored curves represent the leading discriminant time series estimated using the number of Laplacian specified in the legend. Note that as the number of Laplacians increases, the spatial pattern of the forced response becomes more complex.

Table S1. Summary of the CMIP5 models used in this study. Externally forced changes in the PI are estimated using historical runs, which contain aerosol and greenhouse gas forcing. Internal variability is estimated from 192 year segments of model pre-industrial control runs.

Modeling Center	Model Name	Historical Ensemble Size
Canadian Centre for Climate Modeling and Analysis	Second generation Canadian Earth System Model (CanESM2)	5
National Center for Atmospheric Research	Community Climate System Model, version 4 (CCSM4)	5
National Center for Atmospheric Research	Community Earth System Model (CESM)	3
Commonwealth Scientific and Industrial Research Organisation (CSIRO)	CSIRO Mark version 3.6.0 (CSIRO)	10
LASG, Institute of Atmospheric Physics, Chinese Academy of Sciences and CESS, Tsinghua University	Flexible Global Ocean-Atmosphere-Land System Model gridpoint, version 2 (FGOALS)	5
National Oceanic and Atmospheric Administration (NOAA), Geophysical Dynamics Laboratory (GFDL)	Climate Model, version 3 (GFDL-CM3)	5
National Oceanic and Atmospheric Administration (NOAA), Geophysical Dynamics Laboratory (GFDL)	Earth System Model with MOM4 ocean model (GFDL-ESM2M)	1
National Aeronautics and Space Administration, Goddard Institute for Space Studies (GISS)	Model E2 coupled with HYCOM ocean model (GISS-E2H)	10
National Aeronautics and Space Administration, Goddard Institute for Space Studies (GISS)	Model E2 coupled with Russell ocean model (GISS-E2R)	16
L'Institut Pierre-Simon Laplace (IPSL)	Coupled Model, version 5, low resolution (IPSL-CM5A-LR)	5
Norwegian Climate Centre	Earth System model, version 1, medium resolution (NorESM1)	3