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## Supplemental Material

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A Mass and Energy Conservation Analysis of Drift in the CMIP6 Ensemble

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**Table S1.** Ocean variables (and version number) used for each CMIP6 model. Each variable is defined in Table 2.

	<b>masso</b>	<b>volo</b>	<b>thetaoga</b>	<b>wfo</b>	<b>hfds</b>	<b>hfgeou</b>	<b>soga</b>	<b>areacello</b>	<b>cpocean</b>
ACCESS-CM2	v20191112		v20191112	v20191112	v20191112		v20191112	v20191112	
ACCESS-ESM1-5	v20191214		v20191214	v20191214	v20191214		v20191214	v20191214	
BCC-CSM2-MR		v20181015	v20181015				v20181015		
BCC-ESM1		v20181218	v20181218				v20181218	v20190613	
CNRM-CM6-1		v20180814	v20180814	v20180814	v20180814	v20180814	v20180814	v20180814	4000
CNRM-ESM2-1		v20181115	v20181115	v20181115	v20181115	v20181115	v20181115	v20181115	
E3SM-1-0	v20191007		v20190815	v20190815	v20190815		v20190815	v20190815	
E3SM-1-1	v20191028		v20191028	v20191028	v20191028		v20191028	v20191028	
EC-Earth3		v20200203	v20200203	v20200203	v20200203	v20200203	v20200203	v20200203	
EC-Earth3-Veg		v20190619	v20190619	v20190619	v20190619	v20190619	v20190619	v20190619	
GFDL-CM4	v20180701		v20180701		v20180701	v20180701	v20180701	v20180701	
GISS-E2-1-G	v20180824		v20180824	v20180824	v20180824		v20180824	v20180824	
GISS-E2-1-G-CC	v20190815		v20190815	v20190815	v20190815		v20190815	v20190325	
HadGEM3-GC31-LL	v20190628		v20190628	v20190628	v20190628	v20190628	v20190628	v20190709	3991.8679571196
IPSL-CM6A-LR		v20181123	v20181123	v20181123	v20181123	v20181123	v20181123	v20181123	
MPI-ESM1-2-HAM	v20190627		v20190627	v20190627	v20190627		v20190627	v20190627	
MPI-ESM1-2-HR	v20190710		v20190710	v20190710	v20190710		v20190710	v20190710	
MPI-ESM1-2-LR	v20190710		v20190710	v20190710	v20190710		v20190710	v20190710	
UKESM1-0-LL	v20190410		v20190410	v20190410	v20190827	v20190705	v20190410	v20190705	3991.8679571196

**Table S2.** Atmosphere variables (and version number) used for each CMIP6 model. Each variable is defined in Table 2.

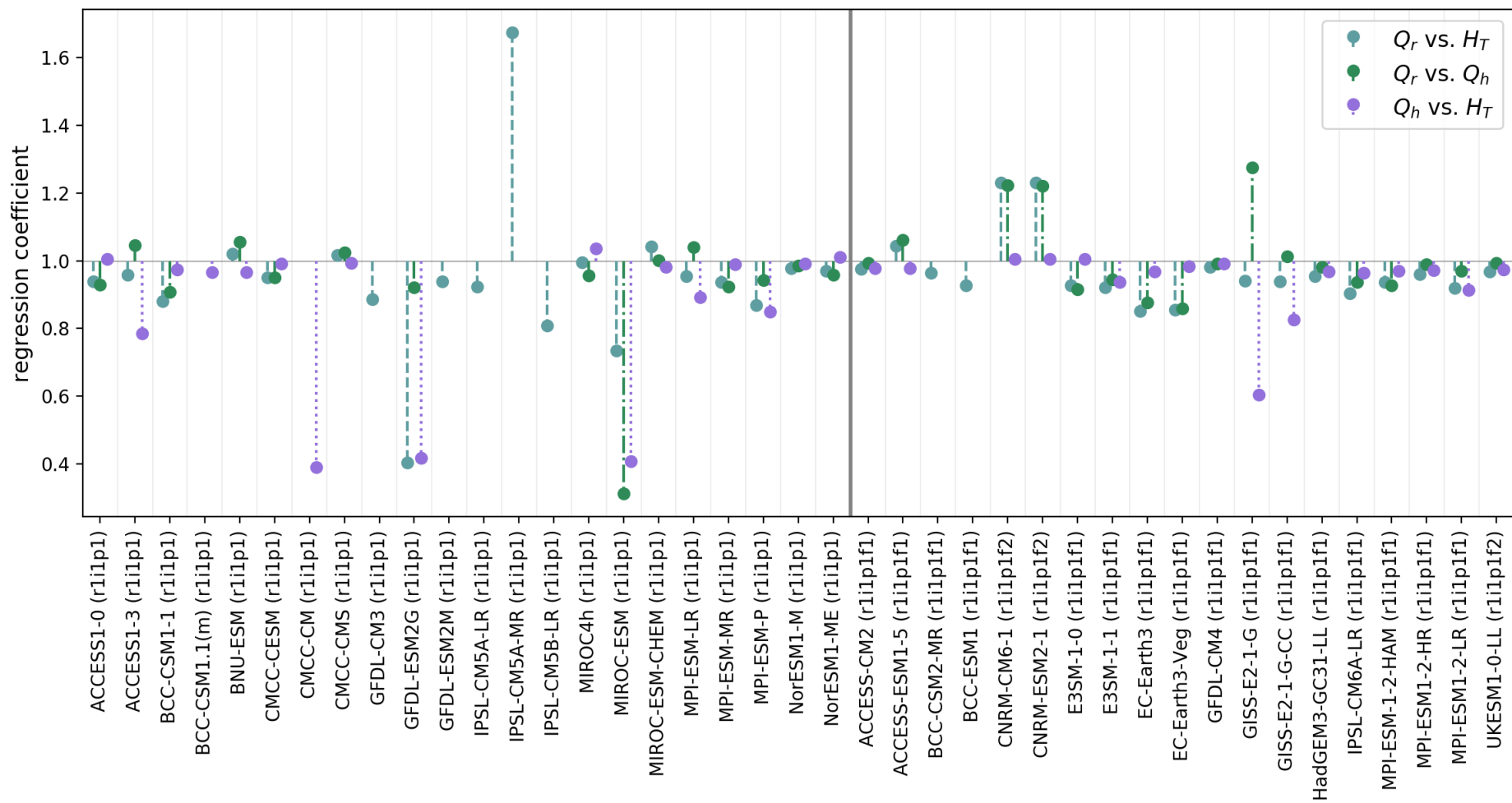
	<b>rsdt</b>	<b>rsut</b>	<b>rlut</b>	<b>prw</b>	<b>pr</b>	<b>evspsbl</b>	<b>areacella</b>
ACCESS-CM2	v20191112	v20191112	v20191112	v20191112	v20191112	v20191112	v20191112
ACCESS-ESM1-5	v20191214	v20191214	v20191214	v20191214	v20191214	v20191214	v20191214
BCC-CSM2-MR	v20181016	v20181016	v20181016	v20181016	v20181016	v20181016	
BCC-ESM1	v20181214	v20181214	v20181214	v20181214	v20181214	v20181214	
CNRM-CM6-1	v20180814	v20180814	v20180814	v20180814			v20180814
CNRM-ESM2-1	v20181115	v20181115	v20181115	v20181115	v20181115	v20181115	v20181115
E3SM-1-0	v20190719	v20190719	v20190719	v20190719	v20190719	v20190719	v20190919
E3SM-1-1	v20191029	v20191029	v20191029	v20191029	v20191029	v20191029	v20191212
EC-Earth3	v20200203	v20200203	v20200203	v20200203	v20200203	v20200203	
EC-Earth3-Veg	v20190619	v20190619	v20190619	v20190619	v20190619	v20190619	
GFDL-CM4	v20180701	v20180701	v20180701	v20180701	v20180701	v20180701	v20180701
GISS-E2-1-G	v20180824	v20180824	v20180824	v20180824	v20180824	v20180824	v20180824
GISS-E2-1-G-CC	v20190815	v20190815	v20190815	v20190815	v20190815	v20190815	v20190325
HadGEM3-GC31-LL	v20190628	v20190628	v20190628	v20190628	v20190628	v20190628	v20190709
IPSL-CM6A-LR	v20181123	v20181123	v20181123	v20181123	v20181123	v20181123	v20181123
MPI-ESM1-2-HAM	v20190627	v20190627	v20190627	v20190627	v20190627	v20190627	v20190627
MPI-ESM1-2-HR	v20190710	v20190710	v20190710	v20190710	v20190710	v20190710	v20190710
MPI-ESM1-2-LR	v20190710	v20190710	v20190710	v20190710	v20190710	v20190710	v20190710
UKESM1-0-LL	v20190410	v20190715	v20190410	v20190410	v20190410	v20190715	v20190705

**Table S3.** Ocean variables (and version number) used for each CMIP5 model. Each variable is defined in Table 2.

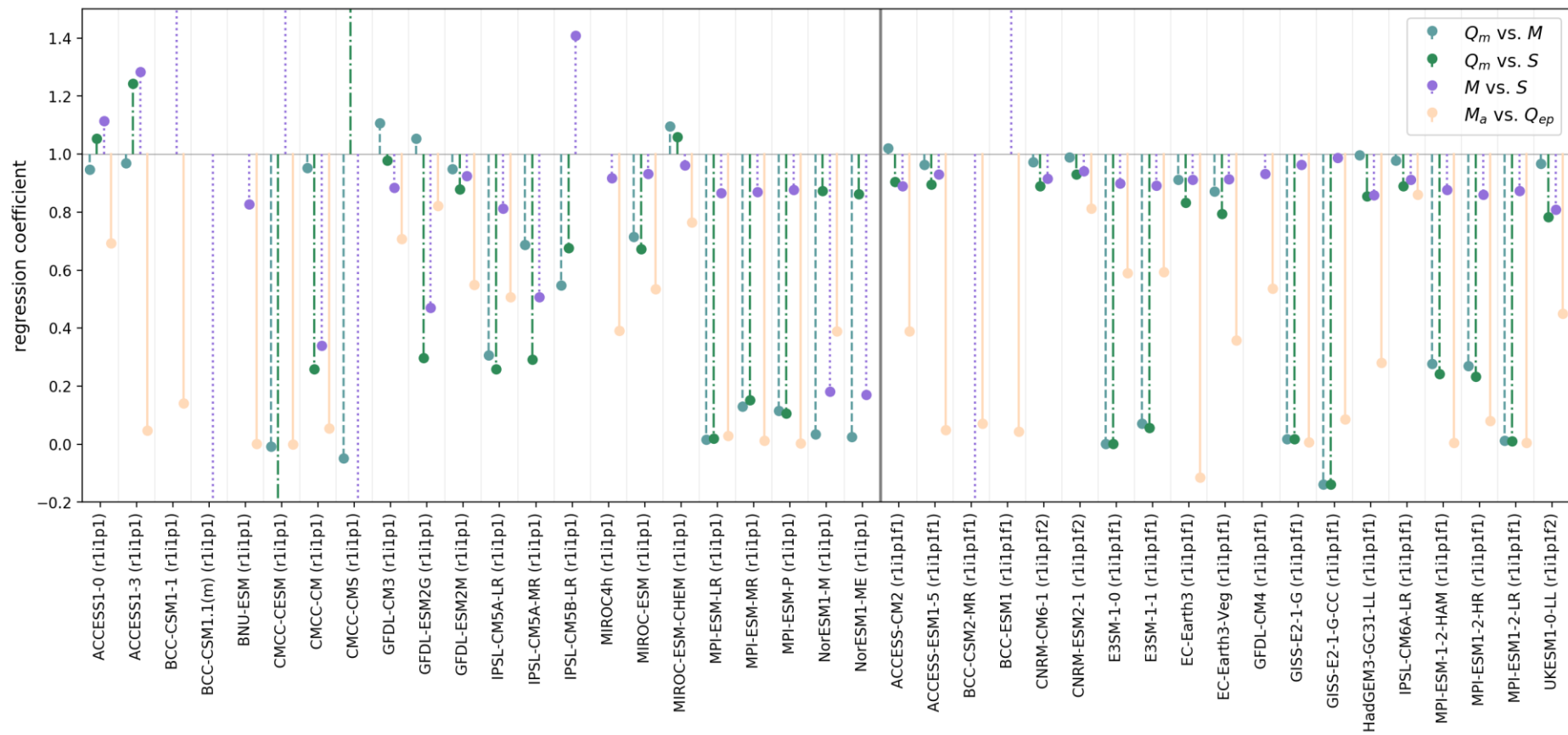
	<b>masso</b>	<b>volo</b>	<b>thetaoga</b>	<b>wfo</b>	<b>hfds</b>	<b>hfgeou</b>	<b>soga</b>	<b>areacello</b>	<b>cpocean</b>
ACCESS1-0	v20140305		v20140305	v20140305	v20140305		v20140305	v20130305	
ACCESS1-3	v20140305		v20140305	v20140305	v20140305		v20140305	v20130305	
BCC-CSM1-1		v20120202	v20120202		v20120202		v20120202	v20130307	3989.24495292815
BCC-CSM1.1(m)		v20120705	v20120705		v20120705		v20120705	v20130307	3989.24495292815
BNU-ESM		v20120504	v20120504		v20120504		v20120504	v20130507	
CMCC-CESM		v20170725	v20170725	v20170725	v20170725		v20170725	v20170725	4000
CMCC-CM		v20170725	v20170725	v20170725	v20170725		v20170725	v20170725	4000
CMCC-CMS		v20170725	v20170725	v20170725	v20170725		v20170725	v20170725	4000
GFDL-CM3	v20110601		v20110601	v20110601			v20110601	v20110601	3992.1
GFDL-ESM2G		v20120820	v20120820	v20120820	v20120820		v20120820	v20110601	3925
GFDL-ESM2M	v20130226		v20130226	v20130226			v20130226	v20130514	3992.1
IPSL-CM5A-LR		v20111119	v20111119	v20111119			v20111119	v20120430	
IPSL-CM5A-MR		v20111119	v20111119	v20111119			v20111119	v20120430	4000
IPSL-CM5B-LR		v20120114	v20120114	v20120114			v20120114	v20120430	4000
MIROC4h		v20110907	v20110907		v20110907		v20110907	v20110825	3990
MIROC-ESM		v20130712	v20130712	v20130712	v20130712		v20130712	v20120608	
MIROC-ESM-CHEM		v20140117	v20140117	v20140117	v20140117		v20140117	v20120608	
MPI-ESM-LR		v20120625	v20120625	v20120625	v20120625		v20120625	v20111006	3902
MPI-ESM-MR		v20120625	v20120625	v20120625	v20120625		v20120625	v20120503	3902
MPI-ESM-P		v20120625	v20120625	v20120625	v20120625		v20120625	v20120625	3902
NorESM1-M	v20110901		v20110901	v20110901	v20110901		v20110901	v20110901	3990
NorESM1-ME	v20120225		v20120225	v20120225	v20120225		v20120225	v20120225	3990

**Table S4.** Atmosphere variables (and version number) used for each CMIP5 model. Each variable is defined in Table 2.

	<b>rsdt</b>	<b>rsut</b>	<b>rlut</b>	<b>prw</b>	<b>pr</b>	<b>evspsbl</b>	<b>areacella</b>
ACCESS1-0	v20130524	v20130524	v20130524	v20130524	v20130524	v20130524	v20120115
ACCESS1-3	v20130524	v20130524	v20130524	v20130524	v20130524	v20130524	v20120413
BCC-CSM1-1	v1	v1	v1	v1	v1	v1	v1
BCC-CSM1.1(m)					v20120705	v20120705	v20120705
BNU-ESM	v20120626	v20120626	v20120626	v20120626	v20120626	v20120626	v20130507
CMCC-CESM	v20170725	v20170725	v20170725	v20170725	v20170725	v20170725	v20170725
CMCC-CM				v20170725	v20170725	v20170725	v20170725
CMCC-CMS	v20170725	v20170725	v20170725	v20170725	v20170725		v20170725
GFDL-CM3	v20120227	v20120227	v20120227	v20120227	v20120227		v20110601
GFDL-ESM2G	v20120830	v20120830	v20120830	v20120830	v20120830	v20120830	v20110601
GFDL-ESM2M	v20130214	v20130214	v20130214	v20130214	v20130214	v20130214	v20120123
IPSL-CM5A-LR	v20130506	v20130506	v20130506	v20130506	v20130506	v20130506	v20110324
IPSL-CM5A-MR	v20111119	v20111119	v20111119		v20111119	v20111119	v20111119
IPSL-CM5B-LR	v20120114	v20120114	v20120114		v20120114	v20120114	v20120430
MIROC4h	v20120628	v20120628	v20120628	v20120628	v20120628	v20120628	v20110825
MIROC-ESM	v20120710	v20120710	v20120710	v20120710	v20120710	v20120710	v20120828
MIROC-ESM-CHEM	v20120710	v20120710	v20120710	v20120710	v20120710	v20120710	v20120828
MPI-ESM-LR	v20120602	v20120602	v20120602	v20120602	v20120602	v20120602	
MPI-ESM-MR	v20120602	v20120602	v20120602	v20120602	v20120602	v20120602	v20120503
MPI-ESM-P	v20120602	v20120602	v20120602	v20120602	v20120602	v20120602	v20120625
NorESM1-M	v20110901	v20110901	v20110901	v20110901	v20110901	v20110901	v20110901
NorESM1-ME	v20120225	v20120225	v20120225		v20120225	v20120225	v20120225



**Figure S1.** Energy conservation after drift removal for the CMIP5 (to the left of vertical dividing line) and CMIP6 (to the right) ensemble. For each model, linear regression coefficients were calculated between pairs of de-drifted time series of interest including the cumulative netTOA ( $Q_r$ ), cumulative heat flux into ocean ( $Q_h$ ) and the temperature component of globally integrated OHC ( $H_T$ ).



**Figure S2.** As per Figure S1 but for mass conservation involving the cumulative freshwater flux into the ocean ( $Q_m$ ), ocean mass ( $M$ ), ocean salinity ( $S$ ), global mass of water vapour ( $M_a$ ) and atmospheric moisture flux ( $Q_{pe}$ ).