

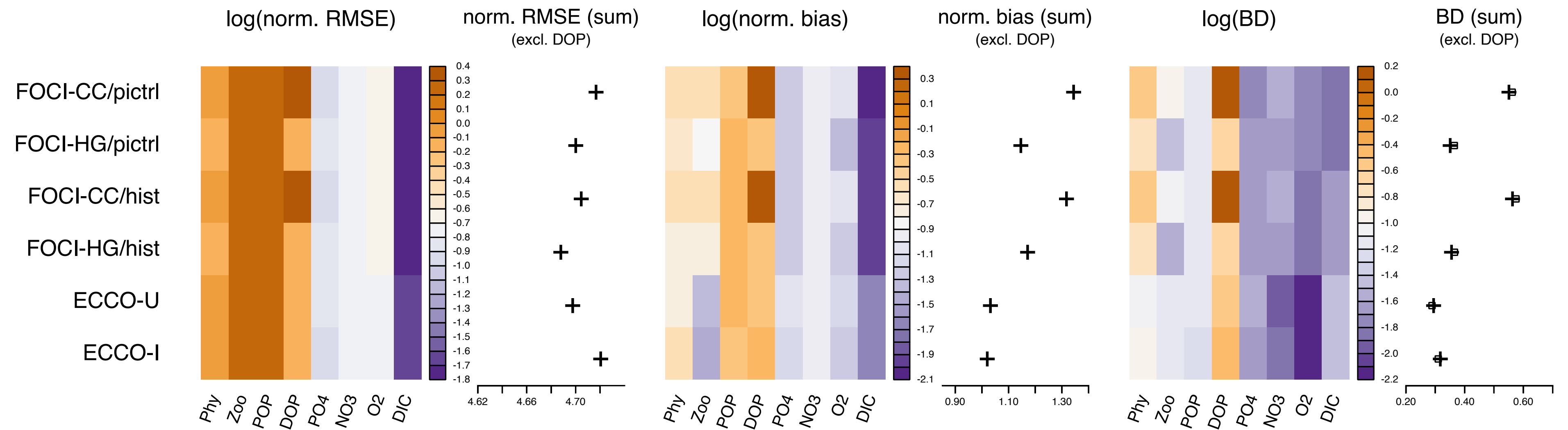
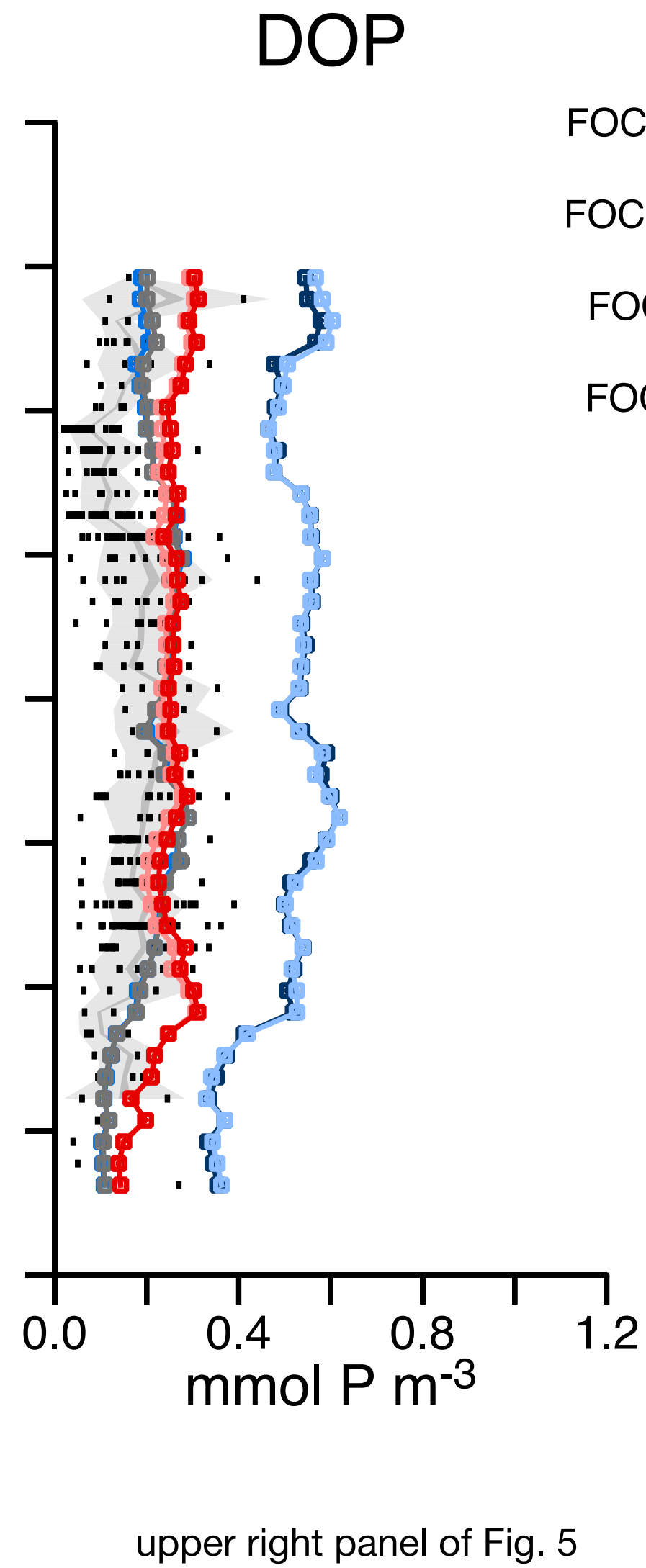


Fig. 8 (changes in DOP color shades only)

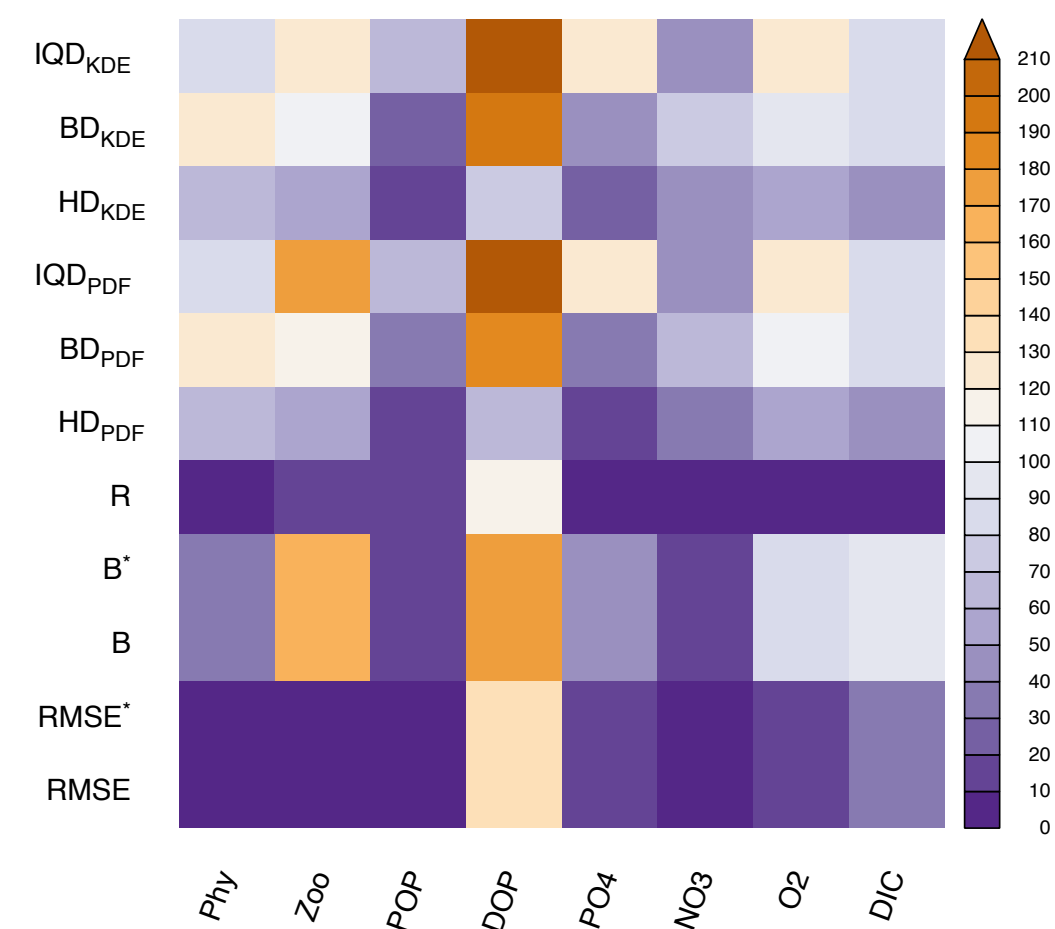
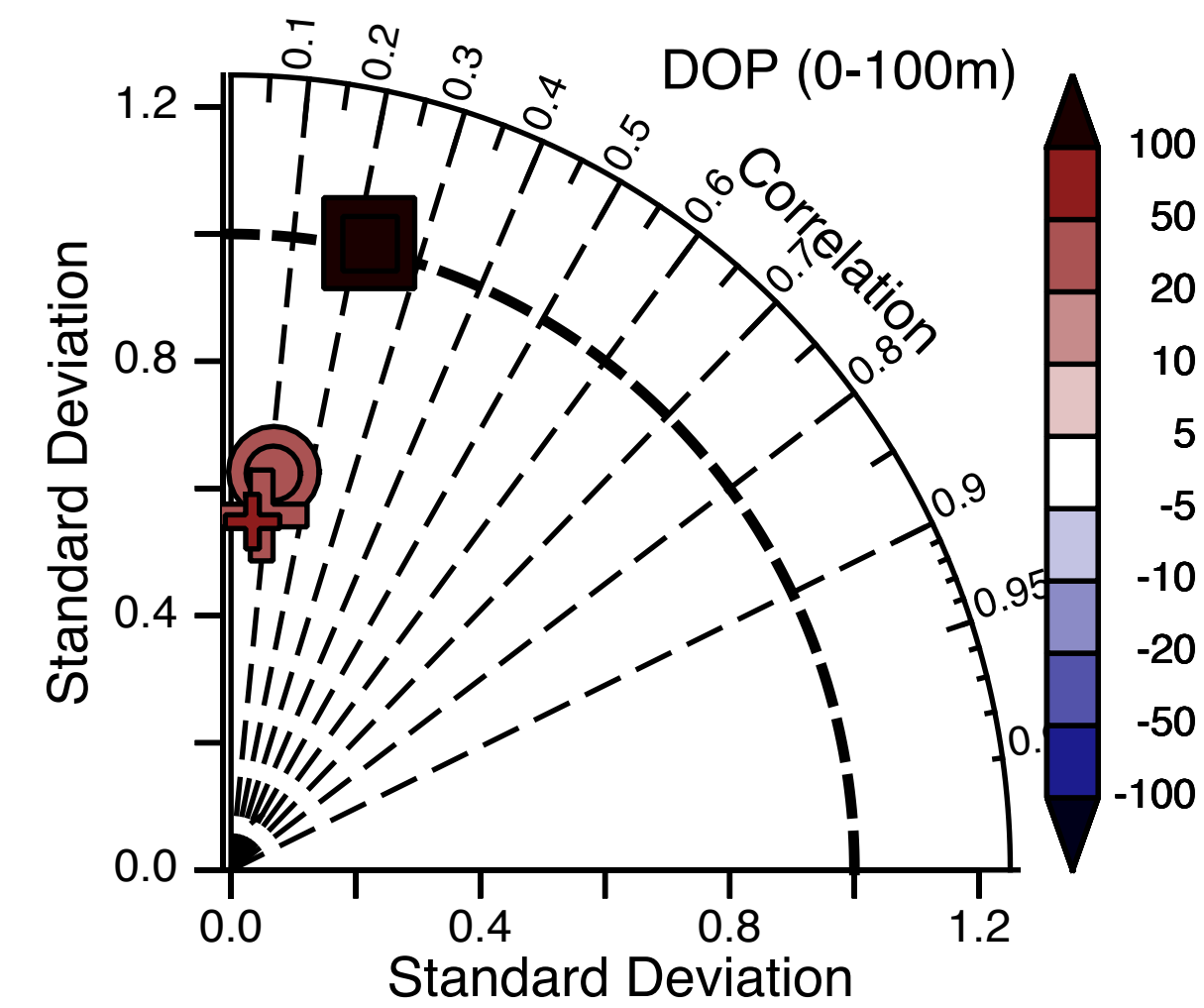
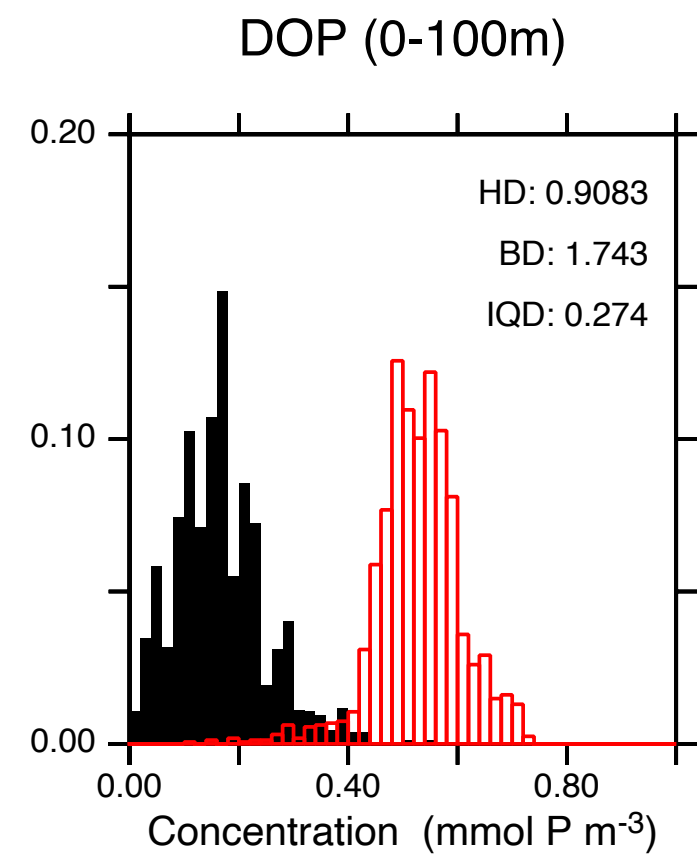


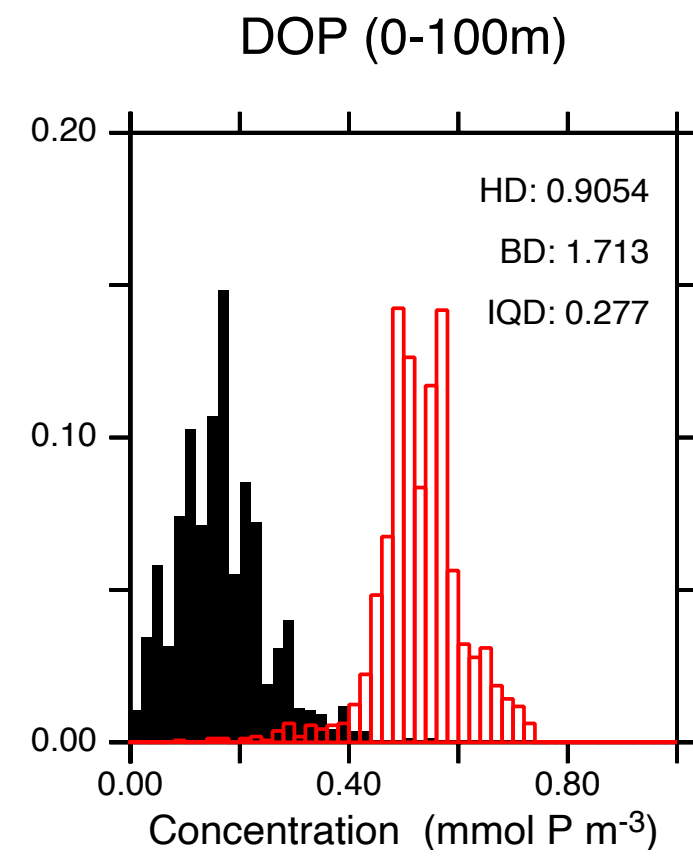
Fig. 11 (changes in DOP color shades and upper limit of colors key, which now includes one value for DOP of 229%)



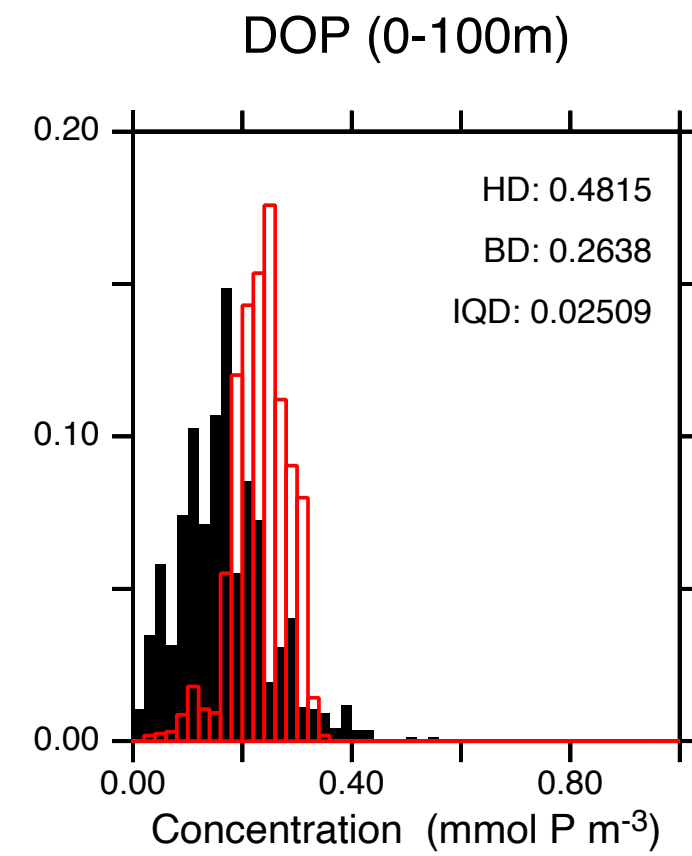
upper right panel of Fig. S7



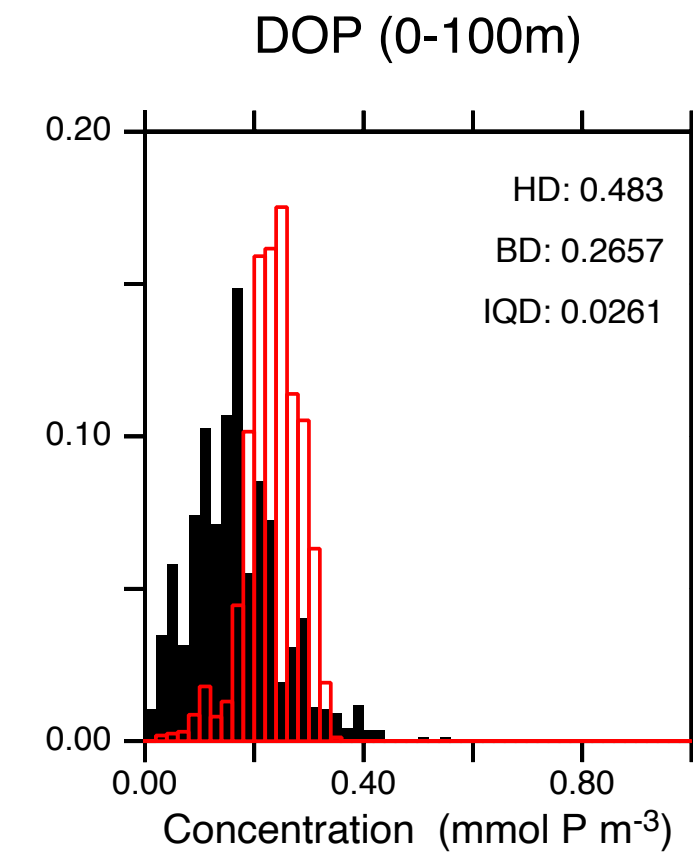
upper right panel of Fig. S8



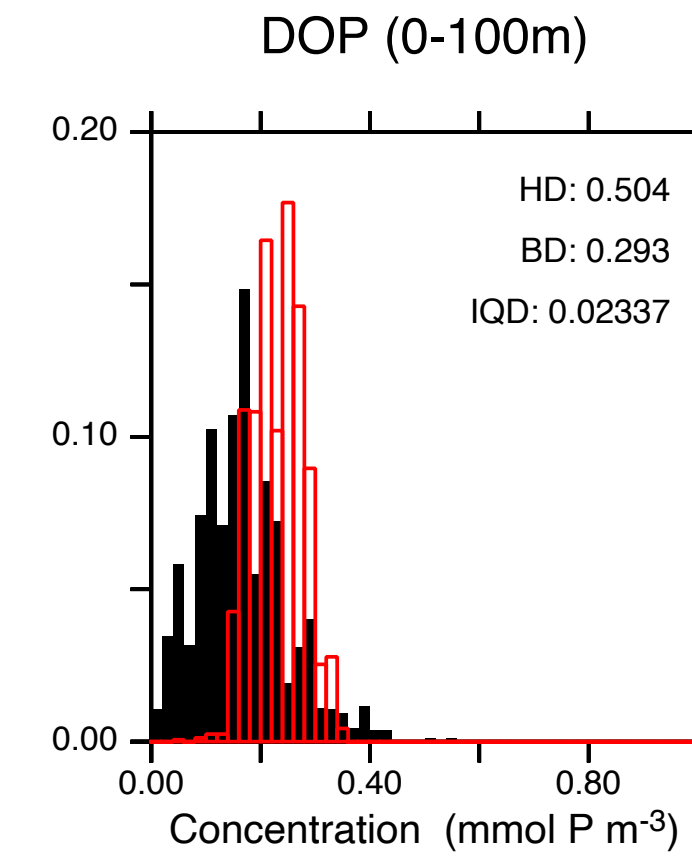
upper right panel of Fig. S9



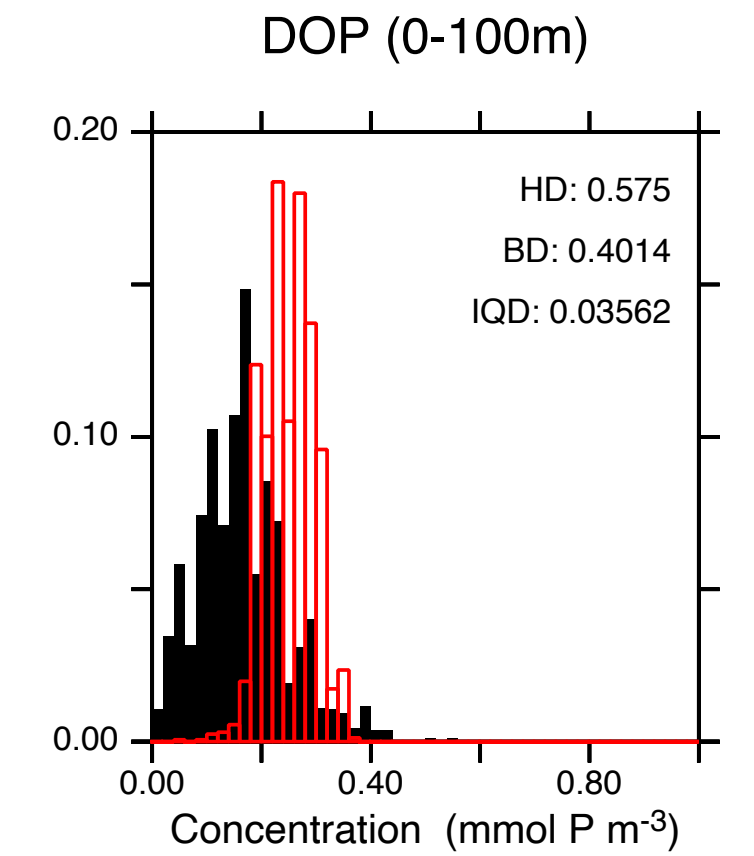
upper right panel of Fig. S10



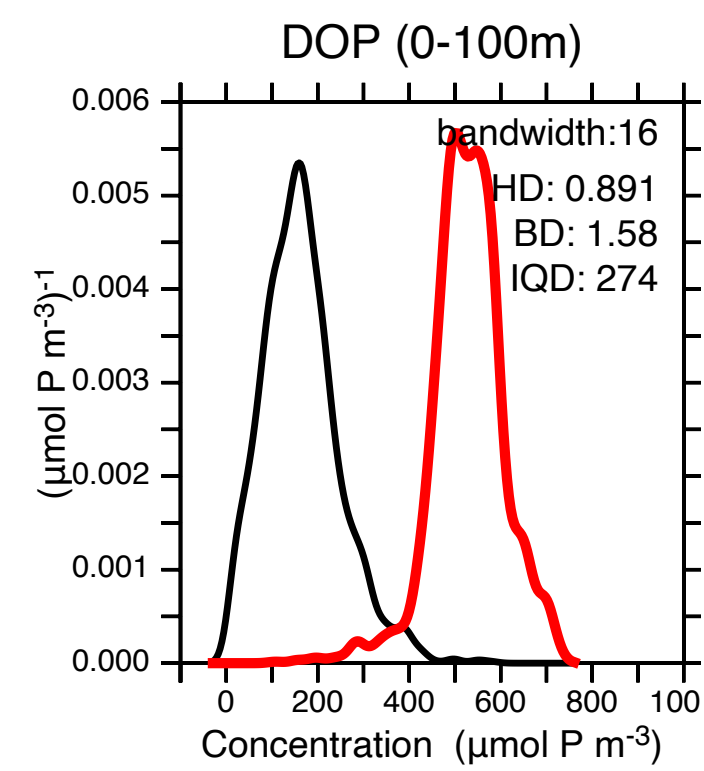
upper right panel of Fig. S11



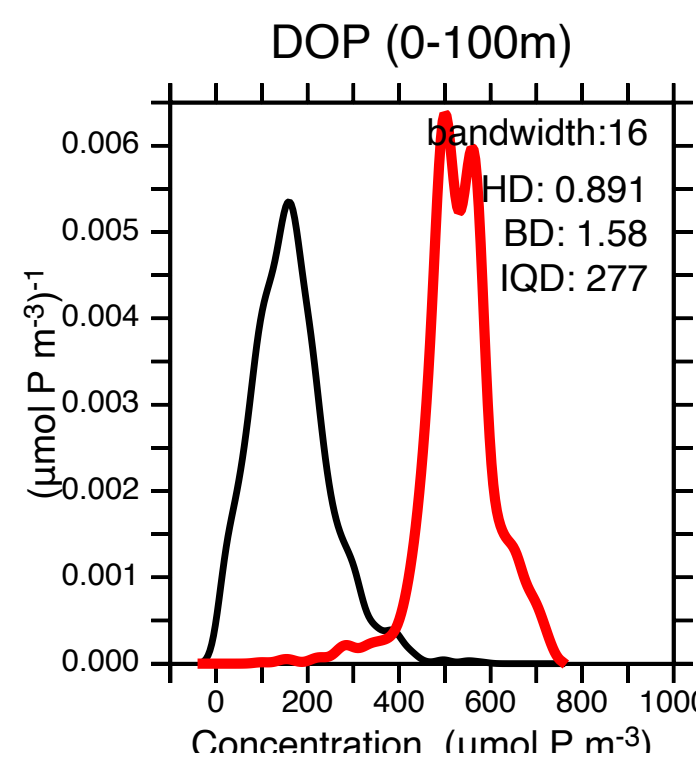
upper right panel of Fig. S12



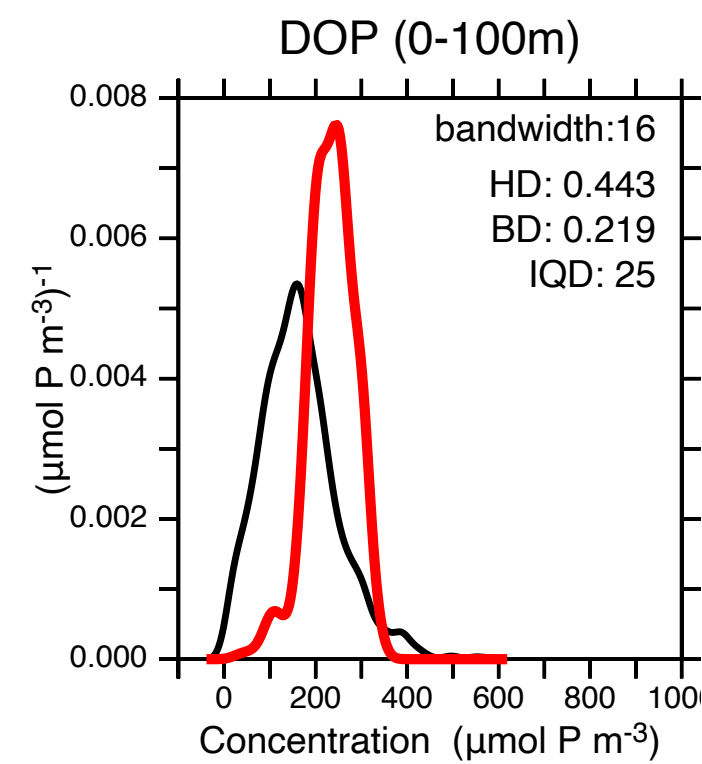
upper right panel of Fig. S13



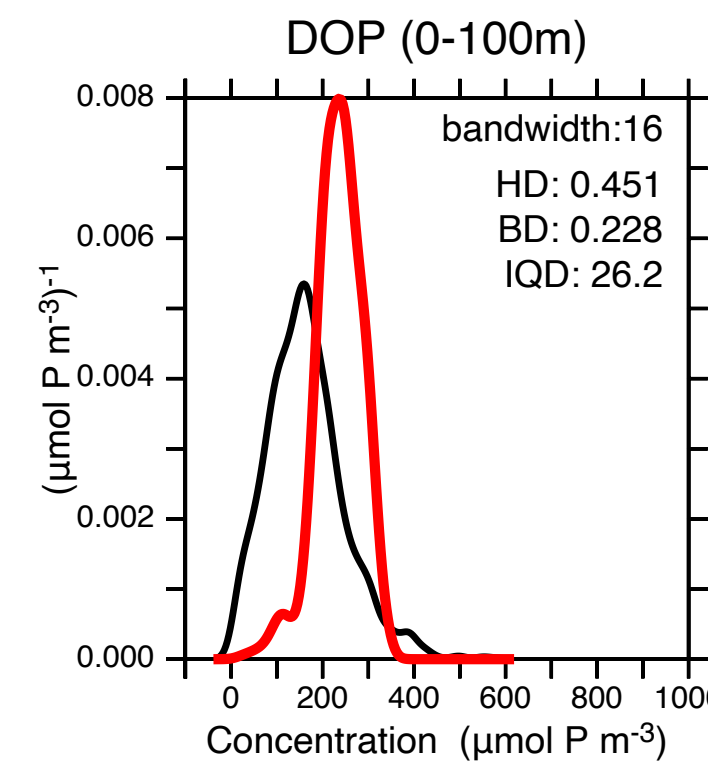
upper right panel of Fig. S14



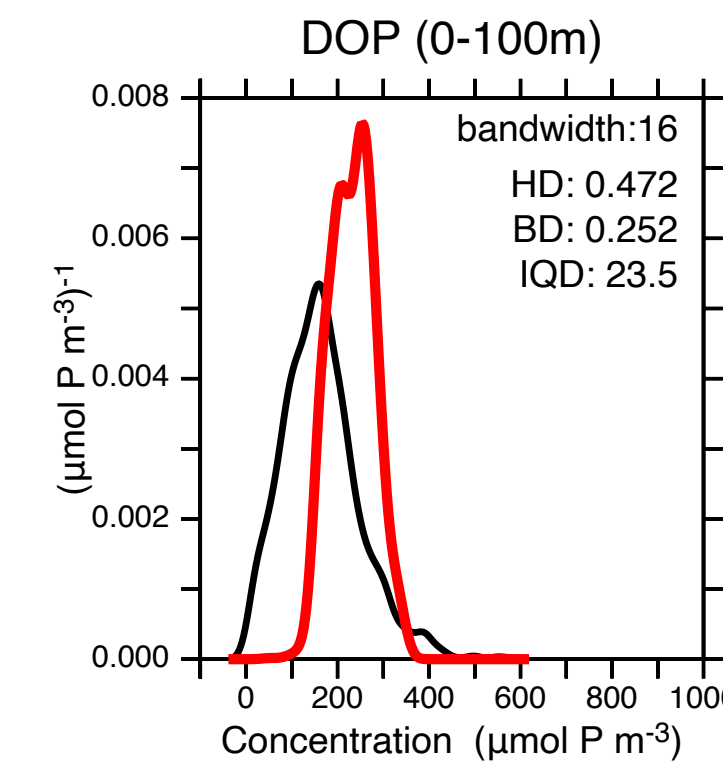
upper right panel of Fig. S15



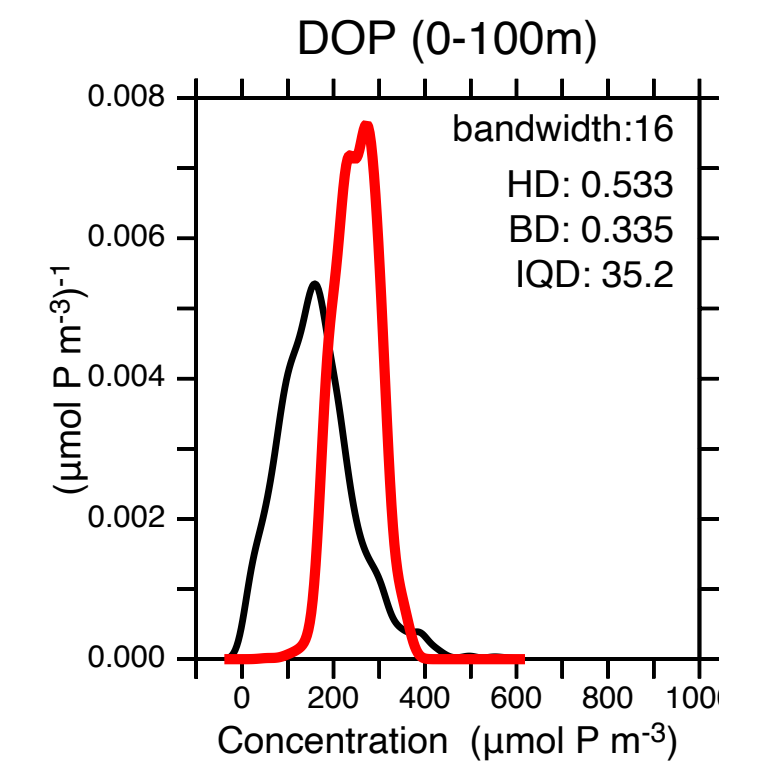
upper right panel of Fig. S16



upper right panel of Fig. S17



upper right panel of Fig. S18



upper right panel of Fig. S19

Table S1. Parametric statistics RMSE, bias B and correlation coefficient R of biogeochemical model tracers for FOCI-CC, FOCI-HG, ECCO-U and ECCO-I. The the unbiased RMSE (RMSE’), correlation coefficient and bias (as percent of observed mean) are shown in Fig. S7.

Experiment	Phy	Zoo	POP	DOP	PO ₄	NO ₃	O ₂	DIC
RMSE								
FOCI-CC / pictrl	0.013	0.010	0.044	0.413 <u>0.377</u>	0.260	5.119	37.091	39.211
FOCI-HG / pictrl	0.012	0.010	0.046	0.224 <u>0.116</u>	0.286	5.241	34.636	43.937
FOCI-CC / hist	0.013	0.010	0.044	0.416 <u>0.378</u>	0.259	5.059	37.738	39.545
FOCI-HG / hist	0.012	0.010	0.046	0.224 <u>0.116</u>	0.284	5.165	34.381	44.762
ECCO-U	0.013	0.010	0.045	0.221 <u>0.112</u>	0.295	4.790	30.943	51.647
ECCO-I	0.013	0.010	0.045	0.228 <u>0.124</u>	0.265	4.762	31.624	54.472
Bias								
FOCI-CC / pictrl	0.004	0.002	-0.013	0.349 <u>0.362</u>	-0.117	-3.527	-13.377	-20.444
FOCI-HG / pictrl	0.003	-0.001	-0.015	0.059 <u>0.070</u>	-0.126	-3.515	-6.506	-25.902
FOCI-HG <u>FOCI-CC</u> / hist	0.004	0.002	-0.013	0.353 <u>0.364</u>	-0.112	-3.406	-15.818	-22.889
FOCI-HG / hist	0.003	-0.001	-0.016	0.061 <u>0.071</u>	-0.121	-3.393	-8.796	-28.312
ECCO-U	0.003	-0.000	-0.014	0.066	-0.176	-3.085	-10.680	-48.614
ECCO-I	0.004	0.000	-0.013	0.085	-0.139	-3.106	-9.854	-51.702
R								
FOCI-CC / pictrl	0.345	0.095	0.413	0.075 <u>0.220</u>	0.973	0.954	0.924	0.965
FOCI-HG / pictrl	0.322	0.095	0.373	0.016 <u>0.109</u>	0.968	0.948	0.942	0.960
FOCI-CC / hist	0.348	0.097	0.417	0.073 <u>0.221</u>	0.973	0.954	0.922	0.952
FOCI-HG / hist	0.334	0.099	0.375	0.016 <u>0.108</u>	0.968	0.948	0.941	0.946
ECCO-U	0.347	0.115	0.398	0.032 <u>0.088</u>	0.970	0.959	0.939	0.970
ECCO-I	0.339	0.111	0.398	0.024 <u>0.063</u>	0.974	0.958	0.935	0.969

Changes (blue) to Table S1

Table S2. Parametric statistics IQD, HD and BD calculated from KDEs of biogeochemical model tracers for FOCI-CC, FOCI-HG, ECCO-U and ECCO-I. See also section 2.4.3 for calculation.

Experiment	Phy	Zoo	POP	DOP	PO ₄	NO ₃	O ₂	DIC
IQD								
FOCI-CC / pictrl	1.886	0.773	1.449	258.100 <u>274.100</u>	0.005	0.140	0.238	1.781
FOCI-HG / pictrl	0.988	0.131	2.374	28.760 <u>25.030</u>	0.005	0.107	0.310	1.854
FOCI-CC / hist	1.833	0.714	1.459	264.200 <u>276.700</u>	0.005	0.128	0.276	2.615
FOCI-HG / hist	0.927	0.131	2.393	31.340 <u>26.160</u>	0.004	0.097	0.183	2.793
ECCO-U	0.793	0.657	1.704	38.710 <u>23.510</u>	0.013	0.116	0.072	3.417
ECCO-I	1.104	0.671	1.318	50.760 <u>35.240</u>	0.007	0.087	0.091	4.200
HD								
FOCI-CC / pictrl	0.509	0.312	0.259	0.829 <u>0.891</u>	0.138	0.168	0.127	0.124
FOCI-HG / pictrl	0.386	0.179	0.270	0.475 <u>0.443</u>	0.151	0.153	0.139	0.123
FOCI-CC / hist	0.519	0.301	0.255	0.835 <u>0.891</u>	0.145	0.165	0.116	0.155
FOCI-HG / hist	0.389	0.172	0.268	0.492 <u>0.451</u>	0.154	0.149	0.124	0.156
ECCO-U	0.278	0.260	0.247	0.568 <u>0.472</u>	0.168	0.110	0.081	0.180
ECCO-I	0.313	0.270	0.233	0.614 <u>0.533</u>	0.147	0.120	0.088	0.193
BD								
FOCI-CC / pictrl	0.300	0.102	0.069	1.165 <u>1.580</u>	0.019	0.029	0.016	0.016
FOCI-HG / pictrl	0.161	0.033	0.075	0.256 <u>0.219</u>	0.023	0.024	0.019	0.015
FOCI-HG <u>FOCI-CC</u> / hist	0.314	0.095	0.067	1.195 <u>1.582</u>	0.021	0.028	0.014	0.024
FOCI-HG / hist	0.164	0.030	0.075	0.277 <u>0.228</u>	0.024	0.022	0.015	0.025
ECCO-U	0.081	0.070	0.063	0.389 <u>0.252</u>	0.029	0.012	0.007	0.033
ECCO-I	0.103	0.076	0.056	0.474 <u>0.335</u>	0.022	0.015	0.008	0.038

Changes (blue) to Table S2