Table S1. Ranges of values for the biogeochemical model parameters and their additional constraints.

Descriptions (unit)	Symbol	Range	Additional constraints
POC sinking speed (m d^{-1})	ω_{POC}	0.02-4	Must be less than ω_{GOC}
Big particles sinking speed (m d^{-1})	ω_{GOC}	0.5-100	
NO_3^- HS of Nanophytoplankton (mol N L^{-1})	$K_{NO_3}^{Nano}$	0.01-2	Must be equal to $K_{NH_4}^{Nano}$
NO_3^- HS of diatoms (mol N L^{-1})	$K_{NO_3}^{Diatoms}$	0.03-6	Must be equal to $K_{NH_4}^{Diatoms}$
NO_3^- HS for DOC remin (mol N L^{-1})	$K_{NO_3}^{Bact}$	0.003-0.6	Must be equal to $K_{NH_4}^{Bact}$
NO_3^- HS for DOC remin (mol N L^{-1})	$K_{NO_3}^{Bact}$	0.003-0.6	Must be equal to $K_{NH_4}^{Bact}$
Quadatric mortality of phytoplankton (d^{-1} mol C^{-1})	ω^P	0.0001-0.02	Must be less than ω_{max}^{Diat}
Maximum quadratic mortality of diatoms (d^{-1} mol C^{-1})	ω_{max}^{Diat}	0.0003-0.06	
Part of calcite not dissolved in MesoZoo guts (/)	ν^M	0.0075-1	Must be between 0 and 1
Part of calcite not dissolved in MicroZoo guts (/)	ν^Z	0.0075-1	Must be between 0 and 1
Maximal MesoZoo grazing rate (d^{-1})	g_m^M	0.005-1	Must be between 0 and 1
Maximal MicroZoo grazing rate (d^{-1})	g_m^Z	0.02-4	Must be 2 times greater than or equal to g_m^M
MesoZoo preference for nanophytoplankton (/)	P_p^M	0.01-1	Must be greater than P_D^M and P_{POC}^M
MesoZoo preference for diatoms (/)	P_D^M	0.003-0.6	Must be less than P_P^M and P_Z^M
MesoZoo preference for POC(/)	P_{POC}^M	0.003-0.6	Must be less than P_P^M and P_Z^M
MesoZoo preference for microzooplankton (/)	P_Z^M	0.01-1	Must be greater than P_D^M and P_{POC}^M
MicroZoo preference for nanophytoplankton (/)	P_p^Z	0.01-1	Must be greater than P_D^Z and P_{POC}^Z
MicroZoo preference for diatoms (/)	P_D^Z	0.008-1	Must be less than P_P^Z
MicroZoo preference for POC (/)	P_{POC}^Z	0.0015-0.3	Must be less than P_P^Z
Growth efficiency of MesoZoo (/)	e^M	0.004-0.8	Sum of e^M and σ^M must be less than or equal to 1
Non-assimilated fraction by MesoZoo (/)	σ^M	0.003-0.6	Sum of e^M and σ^M must be less than or equal to 1.
Growth efficiency of MicroZoo (/)	e^Z	0.004-0.8	Sum of e^Z and σ^Z must be less than or equal to 1
Non-assimilated fraction by MicorZoo (/)	σ^Z	0.003-0.6	Sum of e^Z and σ^Z must be less than or equal to 1.
Fraction of MesoZoo excretion as DOM	γ^M	0.006-1	Must be between 0 and 1
Fraction of MicroZoo excretion as DOM	γ^Z	0.006-1	Must be between 0 and 1
Linear mortality rate of Zoo. (d^{-1})	r^Z	0.0002-0.04	Must be 2 times greater than r^M
Exsudation rate of MesoZoo. (d^{-1})	r^M	0.00005-0.01	

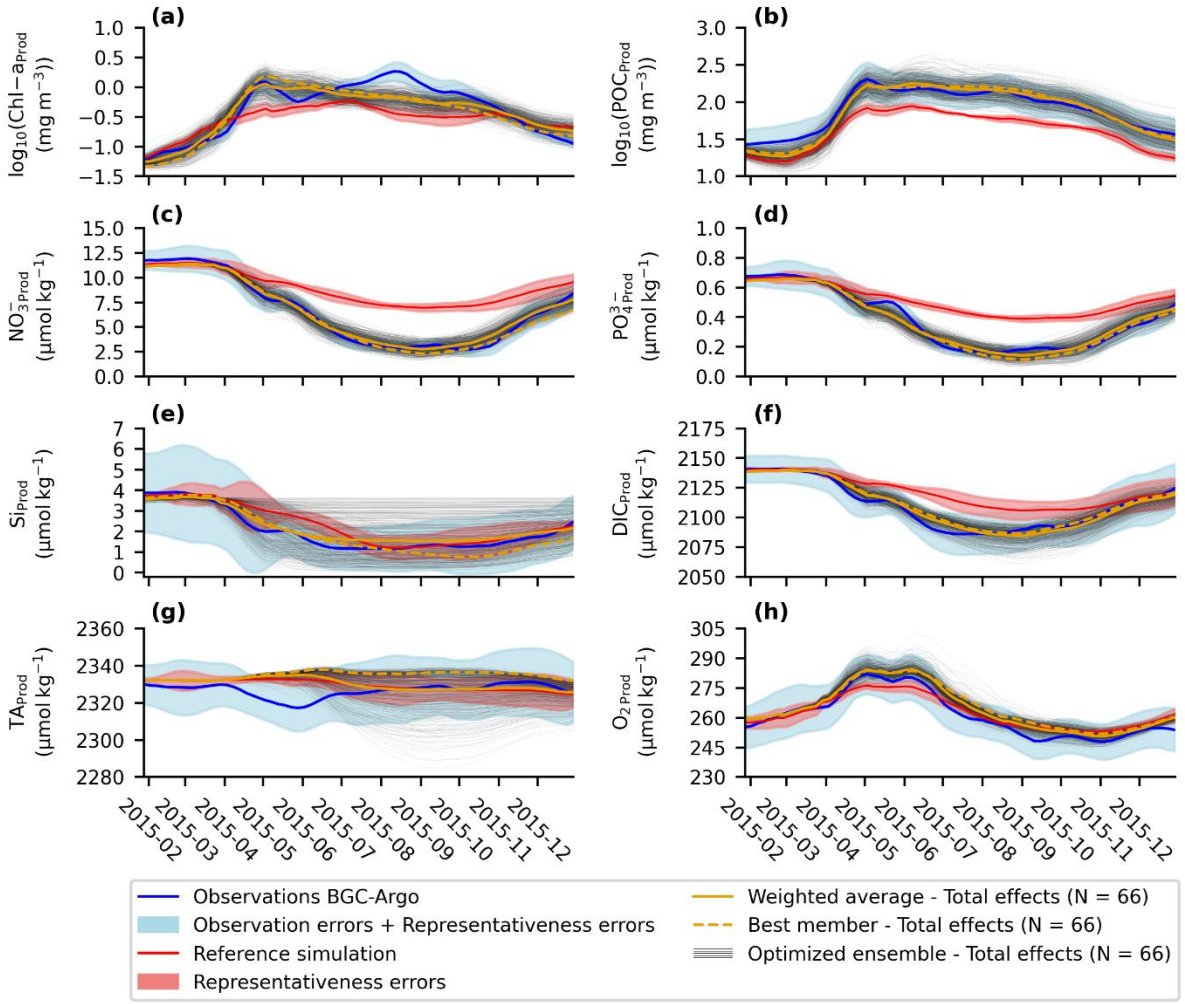

Figure S2. Seasonal cycle of assimilated metrics in the productive layer. Panels show : (**a**) $\log_{10}(\text{Chl-a}_{\text{Prod}})$, (**b**) $\log_{10}(\text{POC}_{\text{Prod}})$, (**c**) $\text{NO}_{3\,\text{Prod}}^{-}$, (**d**) $PO_{4\,\text{Prod}}^{3-}$, (**e**) Si_{Prod}, (**f**) DIC_{Prod}, (**g**) TA_{Prod}, and (**h**) $\text{O}_{2\,\text{Prod}}$. The blue curve represents observations from BGC-Argo float #5904479, with the blue shading indicating the combined observations and representativity errors. The red curve corresponds to the reference simulation from PISCES-1D, with the red shading representing representativity errors. Orange line indicate the weighted means of the ensemble optimized using the Total effects parameters. The black curves represent the simulations of this ensemble. A six-point moving average was applied to all time series to smooth short-term fluctuations.

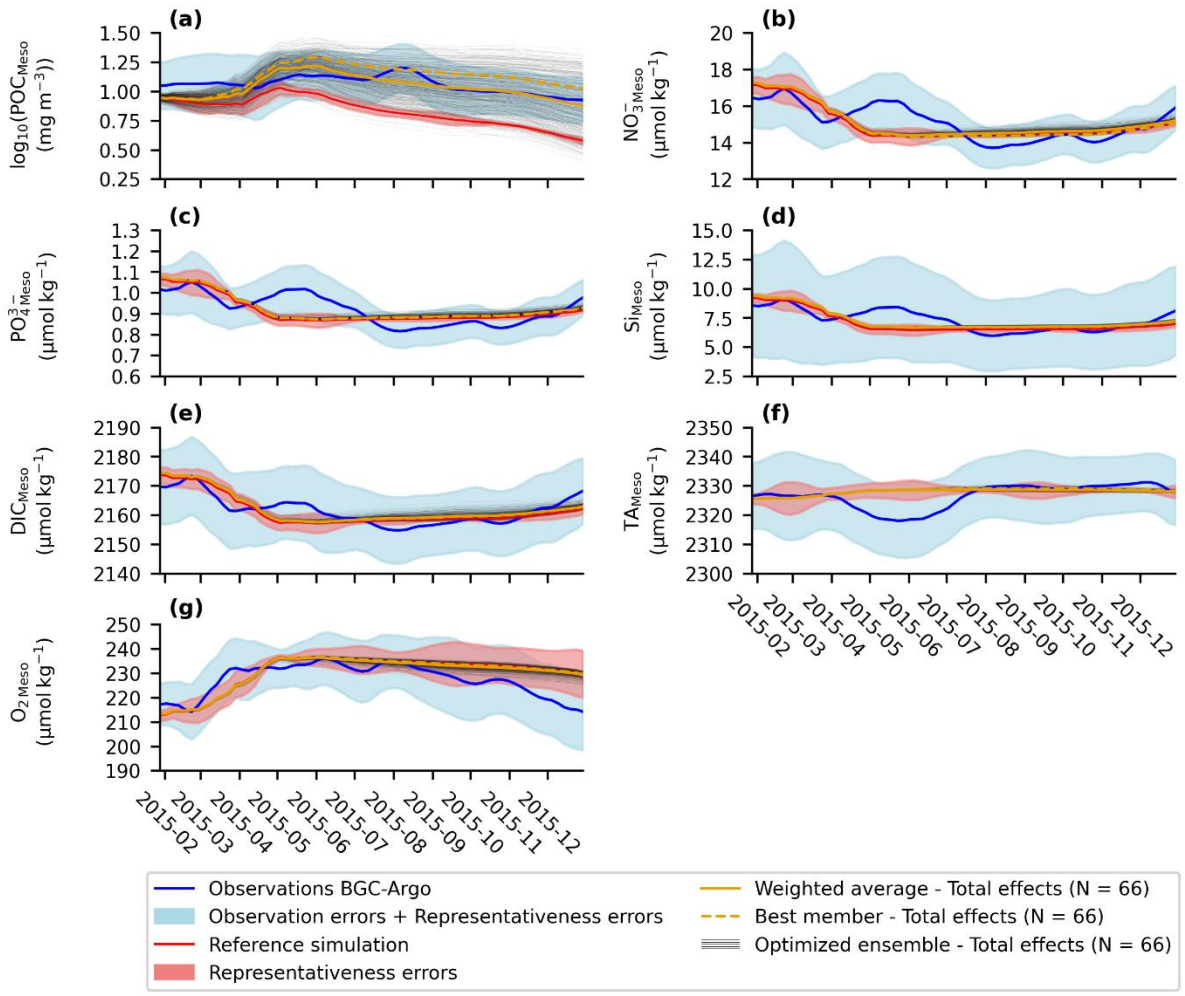

Figure S3. Seasonal cycle of assimilated metrics in the mesopelagic layer. Panels show : (**a**) $\log_{10}(\mathrm{POC}_{\mathrm{Meso}})$ (**b**) $\mathrm{NO}_{3\,\mathrm{Meso}}^{-}$, (**c**) $PO_{4}^{3-}{}_{\mathrm{Meso}}$, (**d**) $\mathrm{Si}_{\mathrm{Meso}}$, (**e**) $\mathrm{DIC}_{\mathrm{Meso}}$, (**f**) $\mathrm{TA}_{\mathrm{Meso}}$, and (**g**) $\mathrm{O}_{2\,\mathrm{Meso}}$. The blue curve represents observations from BGC-Argo float #5904479, with the blue shading indicating the combined observations and representativity errors. The red curve corresponds to the reference simulation from PISCES-1D, with the red shading representing representativity errors. Orange line indicate the weighted means of the ensemble optimized using the Total effects parameters. The black curves represent the simulations of this ensemble. A six-point moving average was applied to all time series to smooth short-term fluctuations.

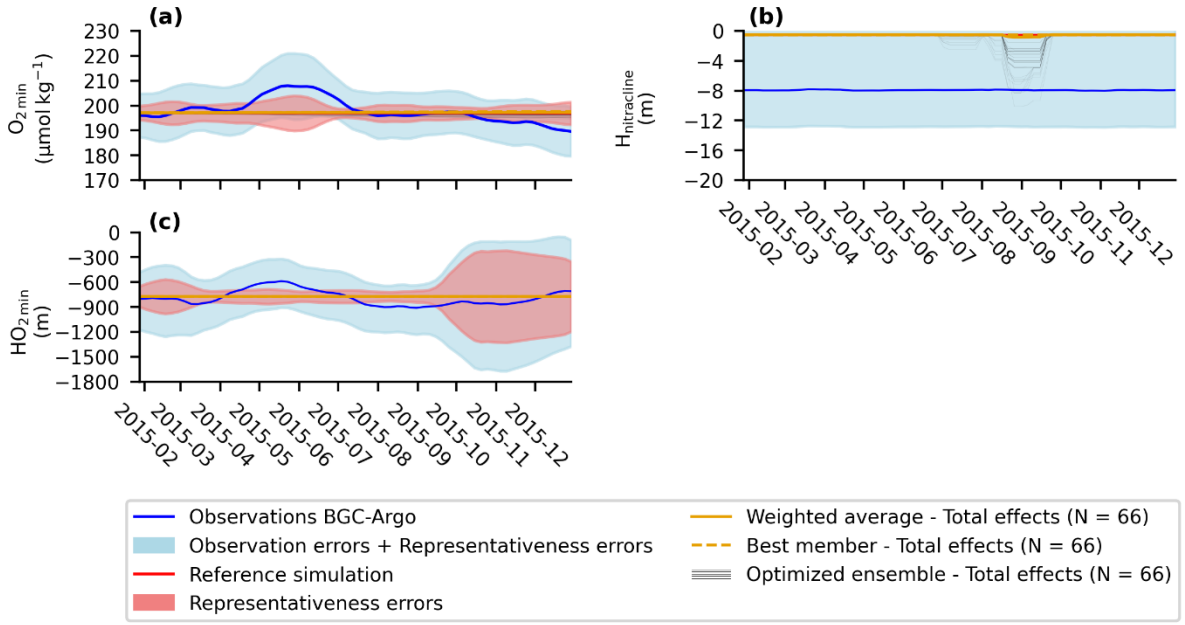

Figure S4. Seasonal cycle of assimilated emerging metrics. Panels show : (**a**) $O_{2_{min}}$, (**b**) $H_{Nitracline}$, (**c**) $HO_{2_{min}}$. Chl_{DCM} and H_{DCM} are not shown, as there were not enough DCM observations to reconstruct these metrics. The blue curve represents observations from BGC-Argo float #5904479, with the blue shading indicating the combined observations and representativity errors. The red curve corresponds to the reference simulation from PISCES-1D, with the red shading representing representativity errors. Orange line indicate the weighted means of the ensemble optimized using the Total effects parameters. The black curves represent the simulations of this ensemble. A six-point moving average was applied to all time series to smooth short-term fluctuations.

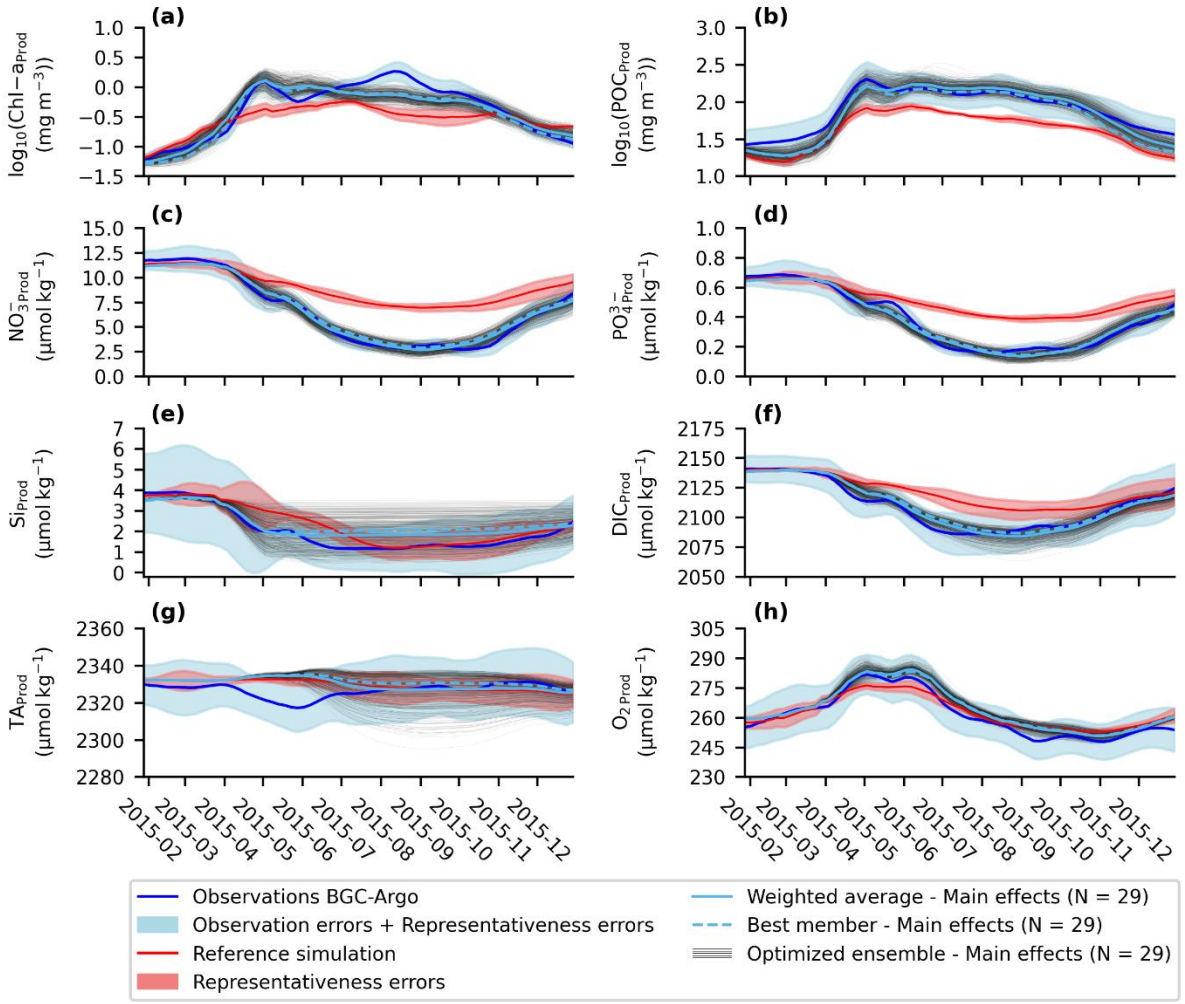

Figure S5. Seasonal cycle of assimilated metrics in the productive layer. Panels show : (**a**) $\log_{10}(\text{Chl-a}_{\text{Prod}})$, (**b**) $\log_{10}(\text{POC}_{\text{Prod}})$, (**c**) $\text{NO}_{3\,\text{Prod}}^{-}$, (**d**) $PO_{4\,\text{Prod}}^{3-}$, (**e**) Si_{Prod}, (**f**) DIC_{Prod}, (**g**) TA_{Prod}, and (**h**) $\text{O}_{2\,\text{Prod}}$. The blue curve represents observations from BGC-Argo float #5904479, with the blue shading indicating the combined observations and representativity errors. The red curve corresponds to the reference simulation from PISCES-1D, with the red shading representing representativity errors. Blue line indicate the weighted means of the ensemble optimized using the Main effects parameters. The black curves represent the simulations of this ensemble. A six-point moving average was applied to all time series to smooth short-term fluctuations.

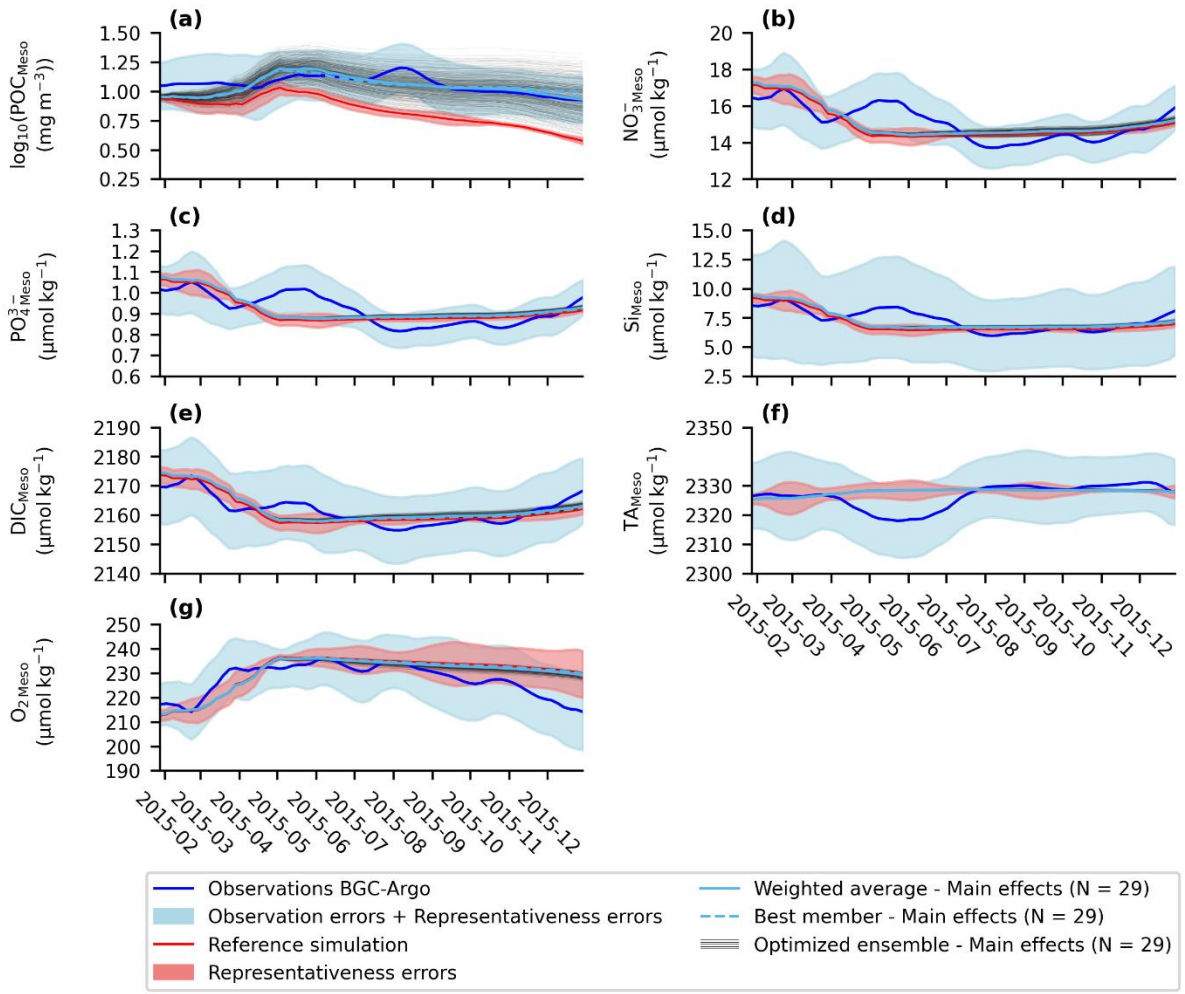

Figure S6. Seasonal cycle of assimilated metrics in the mesopelagic layer. Panels show : (**a**) $\log_{10}(\mathrm{POC}_{\mathrm{Meso}})$ (**b**) $\mathrm{NO}_{3\,\mathrm{Meso}}^{-}$, (**c**) $PO_{4\,\mathrm{Meso}}^{3-}$, (**d**) $\mathrm{Si}_{\mathrm{Meso}}$, (**e**) $\mathrm{DIC}_{\mathrm{Meso}}$, (**f**) $\mathrm{TA}_{\mathrm{Meso}}$, and (**g**) $\mathrm{O}_{2\,\mathrm{Meso}}$. The blue curve represents observations from BGC-Argo float #5904479, with the blue shading indicating the combined observations and representativity errors. The red curve corresponds to the reference simulation from PISCES-1D, with the red shading representing representativity errors. Blue line indicate the weighted means of the ensemble optimized using the Main effects parameters. The black curves represent the simulations of this ensemble. A six-point moving average was applied to all time series to smooth short-term fluctuations.

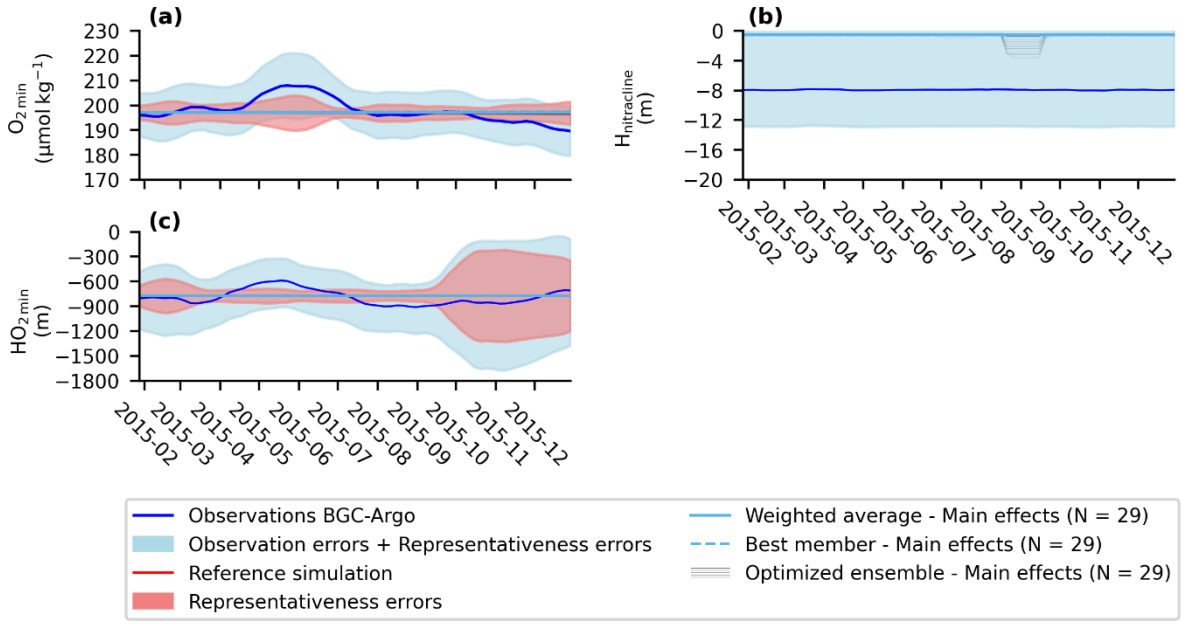

Figure S7. Seasonal cycle of assimilated emerging metrics. Panels show : (**a**) $O_{2_{min}}$, (**b**) $H_{Nitracline}$, (**c**) $HO_{2_{min}}$. Chl_{DCM} and H_{DCM} are not shown, as there were not enough DCM observations to reconstruct these metrics. The blue curve represents observations from BGC-Argo float #5904479, with the blue shading indicating the combined observations and representativity errors. The red curve corresponds to the reference simulation from PISCES-1D, with the red shading representing representativity errors. Blue line indicate the weighted means of the ensemble optimized using the Main effects parameters. The black curves represent the simulations of this ensemble. A six-point moving average was applied to all time series to smooth short-term fluctuations.

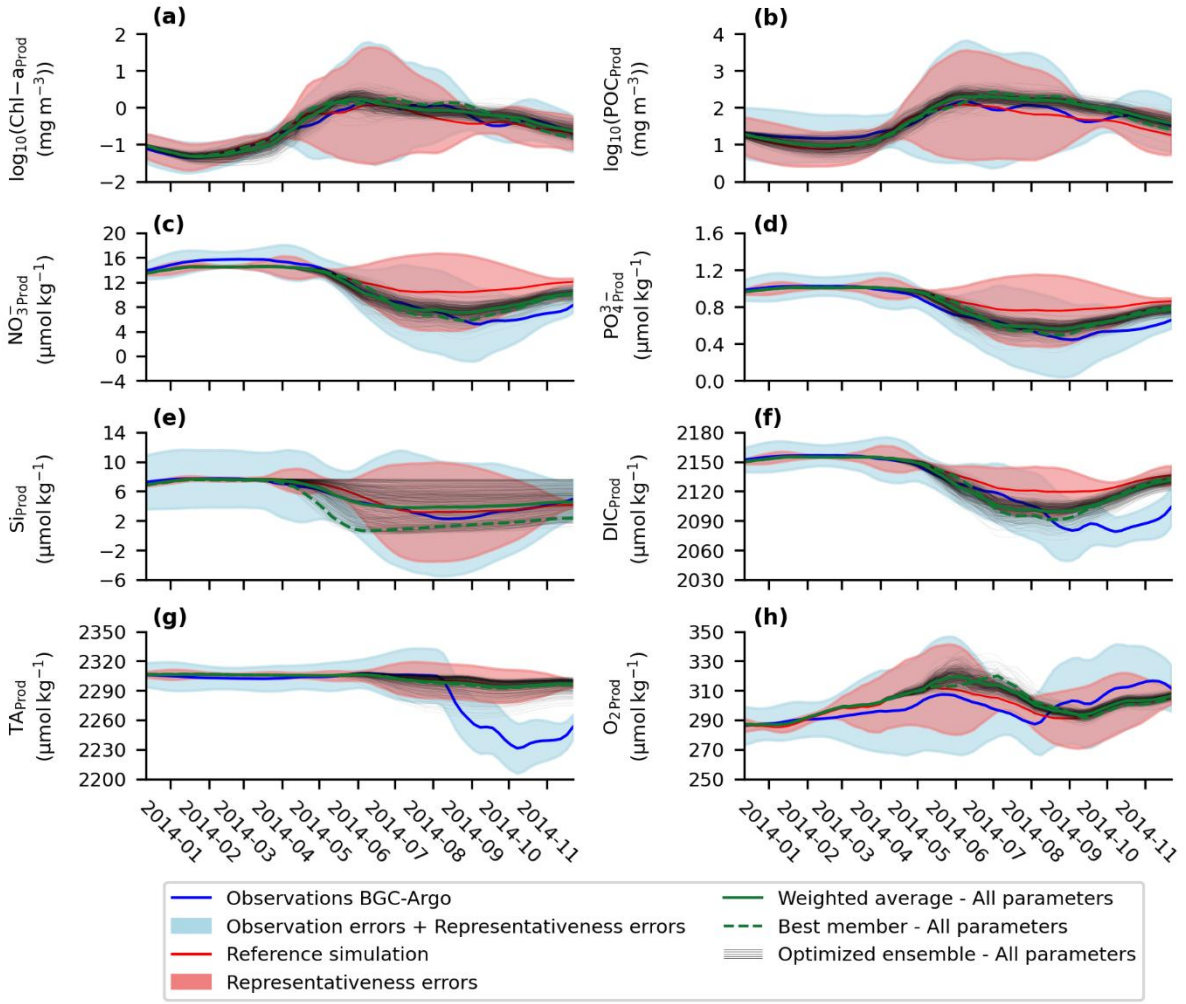

Figure S8. Seasonal cycle of assimilated metrics in the productive layer. Panels show : (**a**) $\log_{10}(\text{Chl-a}_{\text{Prod}})$, (**b**) $\log_{10}(\text{POC}_{\text{Prod}})$, (**c**) $\text{NO}_{3\,\text{Prod}}^{-}$, (**d**) $PO_{4\,\text{Prod}}^{3-}$, (**e**) Si_{Prod}, (**f**) DIC_{Prod}, (**g**) TA_{Prod}, and (**h**) $\text{O}_{2\,\text{Prod}}$. The blue curve represents observations from BGC-Argo float #6901485, with the blue shading indicating the combined observations and representativity errors. The red curve corresponds to the reference simulation from PISCES-1D, with the red shading representing representativity errors. Green line indicate the weighted means of the ensemble optimized using all parameters of the PISCES model. The black curves represent the ensemble of selected members obtained by optimizing all parameters of the PISCES model. A six-point moving average was applied to all time series to smooth short-term fluctuations.

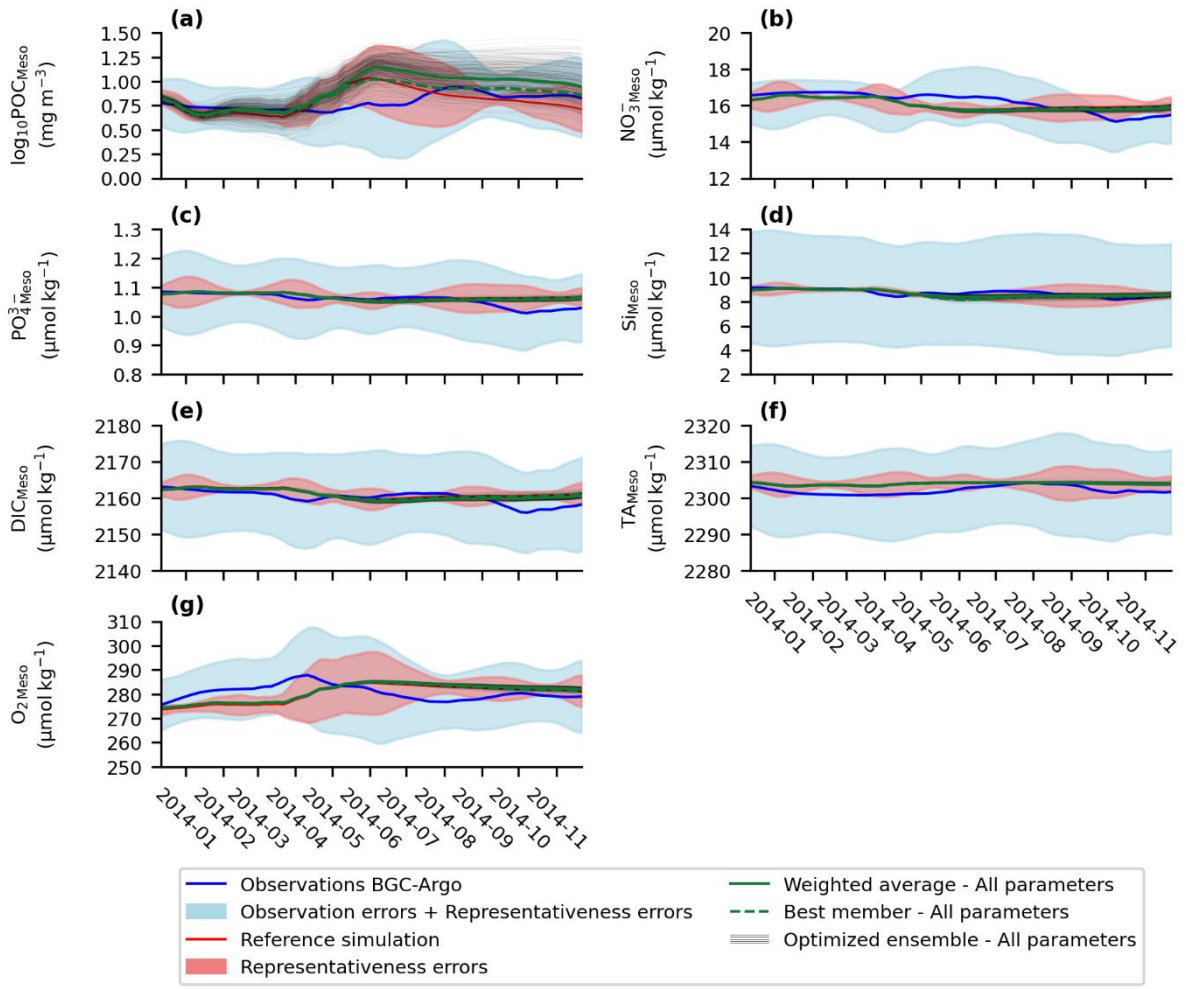

Figure S9. Seasonal cycle of assimilated metrics in the mesopelagic layer. Panels show : (**a**) $\log_{10}(\mathrm{POC}_{\mathrm{Meso}})$ (**b**) $\mathrm{NO}_{3\,\mathrm{Meso}}^{-}$, (**c**) $PO_{4}^{3-}{}_{\mathrm{Meso}}$, (**d**) $\mathrm{Si}_{\mathrm{Meso}}$, (**e**) $\mathrm{DIC}_{\mathrm{Meso}}$, (**f**) $\mathrm{TA}_{\mathrm{Meso}}$, and (**g**) $\mathrm{O}_{2\,\mathrm{Meso}}$. The blue curve represents observations from BGC-Argo float #6901485, with the blue shading indicating the combined observations and representativity errors. The red curve corresponds to the reference simulation from PISCES-1D, with the red shading representing representativity errors. Green line indicate the weighted means of the ensemble optimized using all parameters of the PISCES model. The black curves represent the ensemble of selected members obtained by optimizing all parameters of the PISCES model. A six-point moving average was applied to all time series to smooth short-term fluctuations.

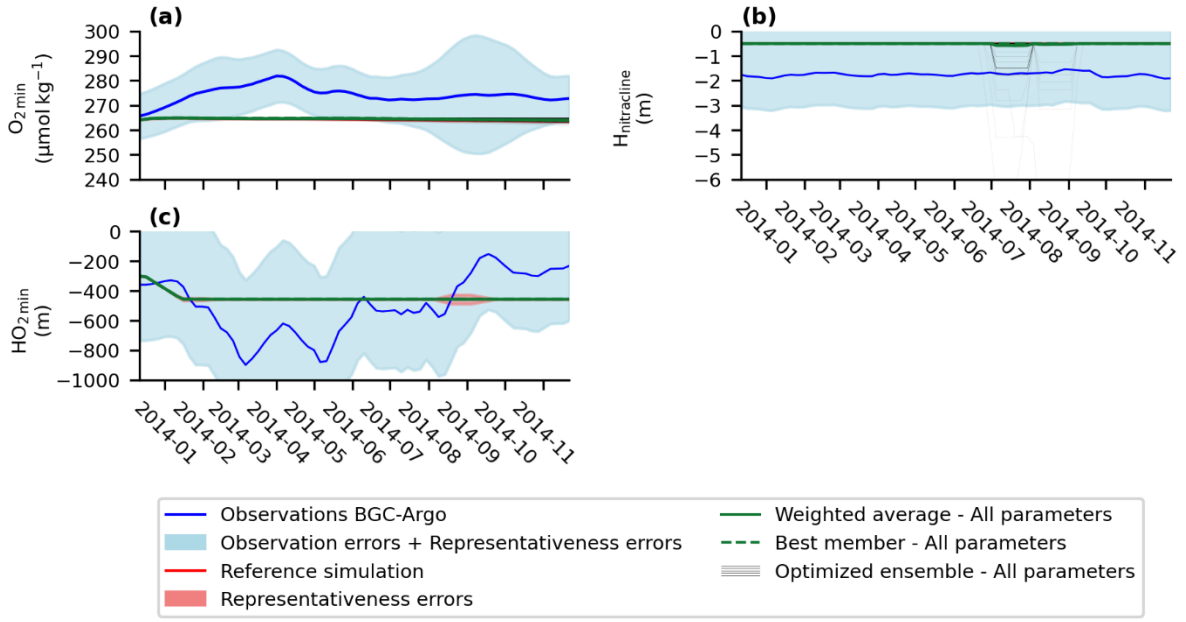

Figure S10. Seasonal cycle of assimilated emerging metrics. Panels show : (**a**) $O_{2_{min}}$, (**b**) $H_{Nitracline}$, (**c**) $HO_{2_{min}}$. Chl_{DCM} and H_{DCM} are not shown, as there were not enough DCM observations to reconstruct these metrics. The blue curve represents observations from BGC-Argo float #6901485, with the blue shading indicating the combined observations and representativity errors. The red curve corresponds to the reference simulation from PISCES-1D, with the red shading representing representativity errors. Green line indicate the weighted means of the ensemble optimized using all parameters of the PISCES model. The black curves represent the ensemble of selected members obtained by optimizing all parameters of the PISCES model. A six-point moving average was applied to all time series to smooth short-term fluctuations.

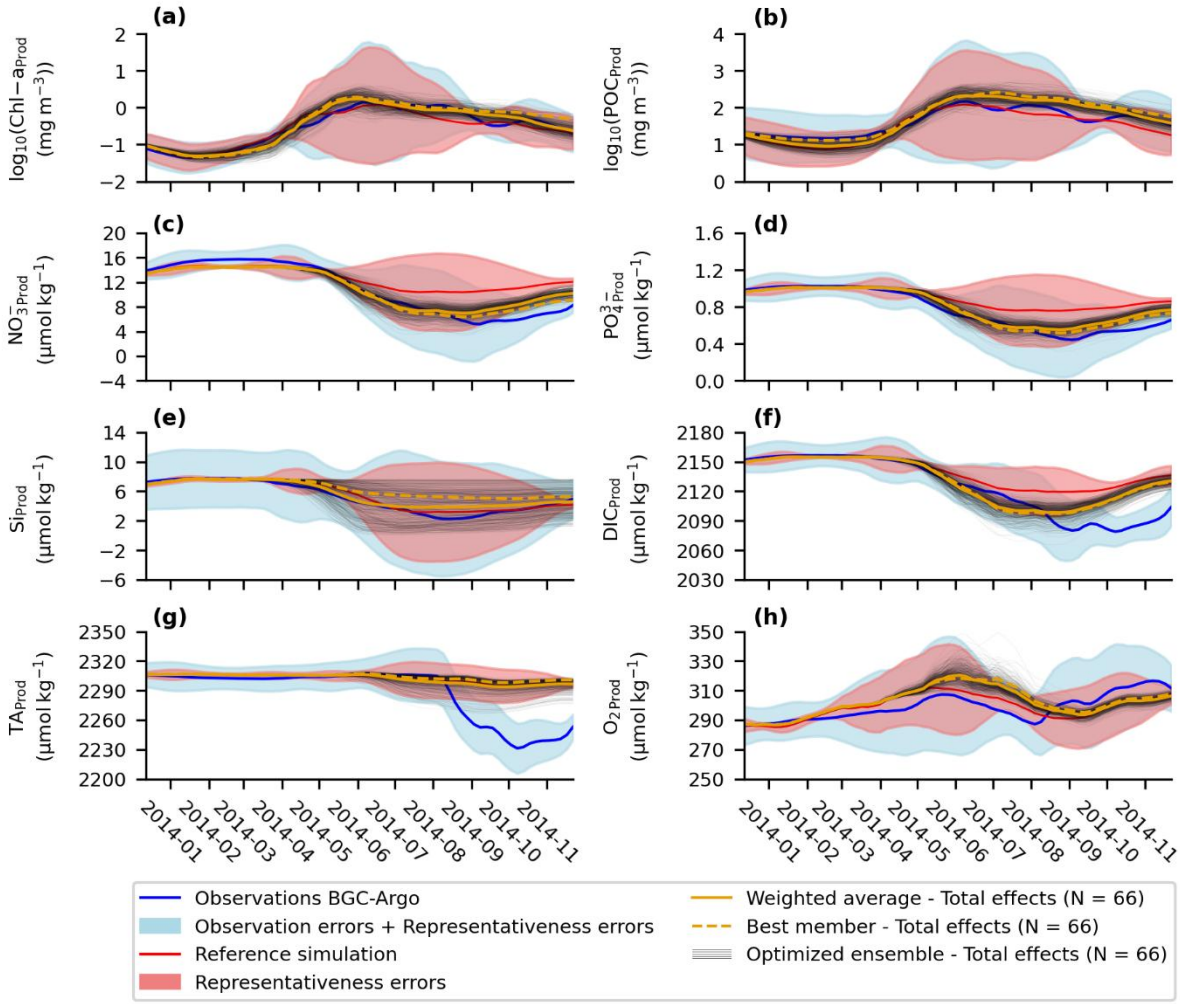

Figure S11. Seasonal cycle of assimilated metrics in the productive layer. Panels show : (**a**) $\log_{10}(\text{Chl-a}_{\text{Prod}})$, (**b**) $\log_{10}(\text{POC}_{\text{Prod}})$, (**c**) $\text{NO}_{3\,\text{Prod}}^{-}$, (**d**) $PO_{4\,\text{Prod}}^{3-}$, (**e**) Si_{Prod}, (**f**) DIC_{Prod}, (**g**) TA_{Prod}, and (**h**) $\text{O}_{2\,\text{Prod}}$. The blue curve represents observations from BGC-Argo float #6901485, with the blue shading indicating the combined observations and representativity errors. The red curve corresponds to the reference simulation from PISCES-1D, with the red shading representing representativity errors. Orange line indicate the weighted means of the ensemble optimized using the Total effects parameters. The black curves represent the simulations of this ensemble. A six-point moving average was applied to all time series to smooth short-term fluctuations.

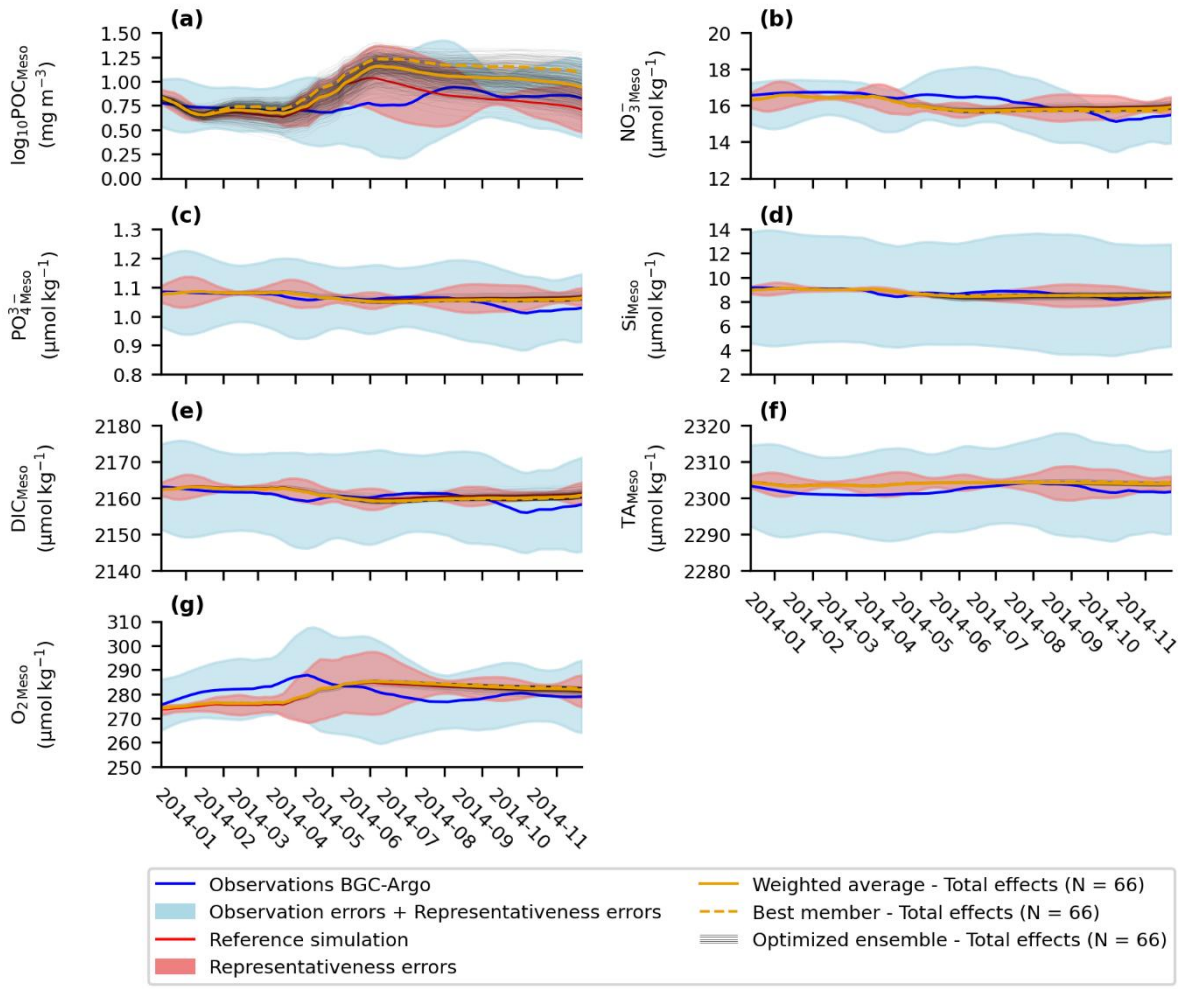

Figure S12. Seasonal cycle of assimilated metrics in the mesopelagic layer. Panels show : (**a**) $\log_{10}(\mathrm{POC}_{\mathrm{Meso}})$ (**b**) $\mathrm{NO}_{3\,\mathrm{Meso}}^{-}$, (**c**) $PO_{4\,\mathrm{Meso}}^{3-}$, (**d**) $\mathrm{Si}_{\mathrm{Meso}}$, (**e**) $\mathrm{DIC}_{\mathrm{Meso}}$, (**f**) $\mathrm{TA}_{\mathrm{Meso}}$, and (**g**) $\mathrm{O}_{2\,\mathrm{Meso}}$. The blue curve represents observations from BGC-Argo float #6901485, with the blue shading indicating the combined observations and representativity errors. The red curve corresponds to the reference simulation from PISCES-1D, with the red shading representing representativity errors. Orange line indicate the weighted means of the ensemble optimized using the Total effects parameters. The black curves represent the simulations of this ensemble. A six-point moving average was applied to all time series to smooth short-term fluctuations.

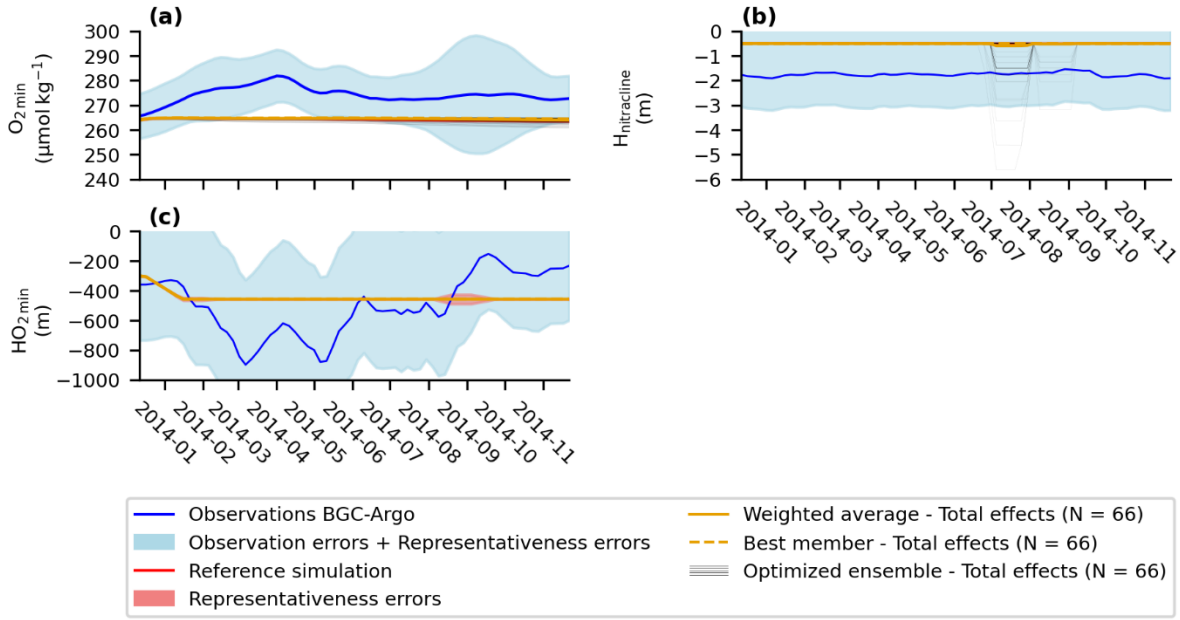

Figure S13. Seasonal cycle of assimilated emerging metrics. Panels show : (**a**) $O_{2_{min}}$, (**b**) $H_{Nitracline}$, (**c**) $HO_{2_{min}}$. Chl_{DCM} and H_{DCM} are not shown, as there were not enough DCM observations to reconstruct these metrics. The blue curve represents observations from BGC-Argo float #6901485, with the blue shading indicating the combined observations and representativity errors. The red curve corresponds to the reference simulation from PISCES-1D, with the red shading representing representativity errors. Orange line indicate the weighted means of the ensemble optimized using the Total effects parameters. The black curves represent the simulations of this ensemble. A six-point moving average was applied to all time series to smooth short-term fluctuations.

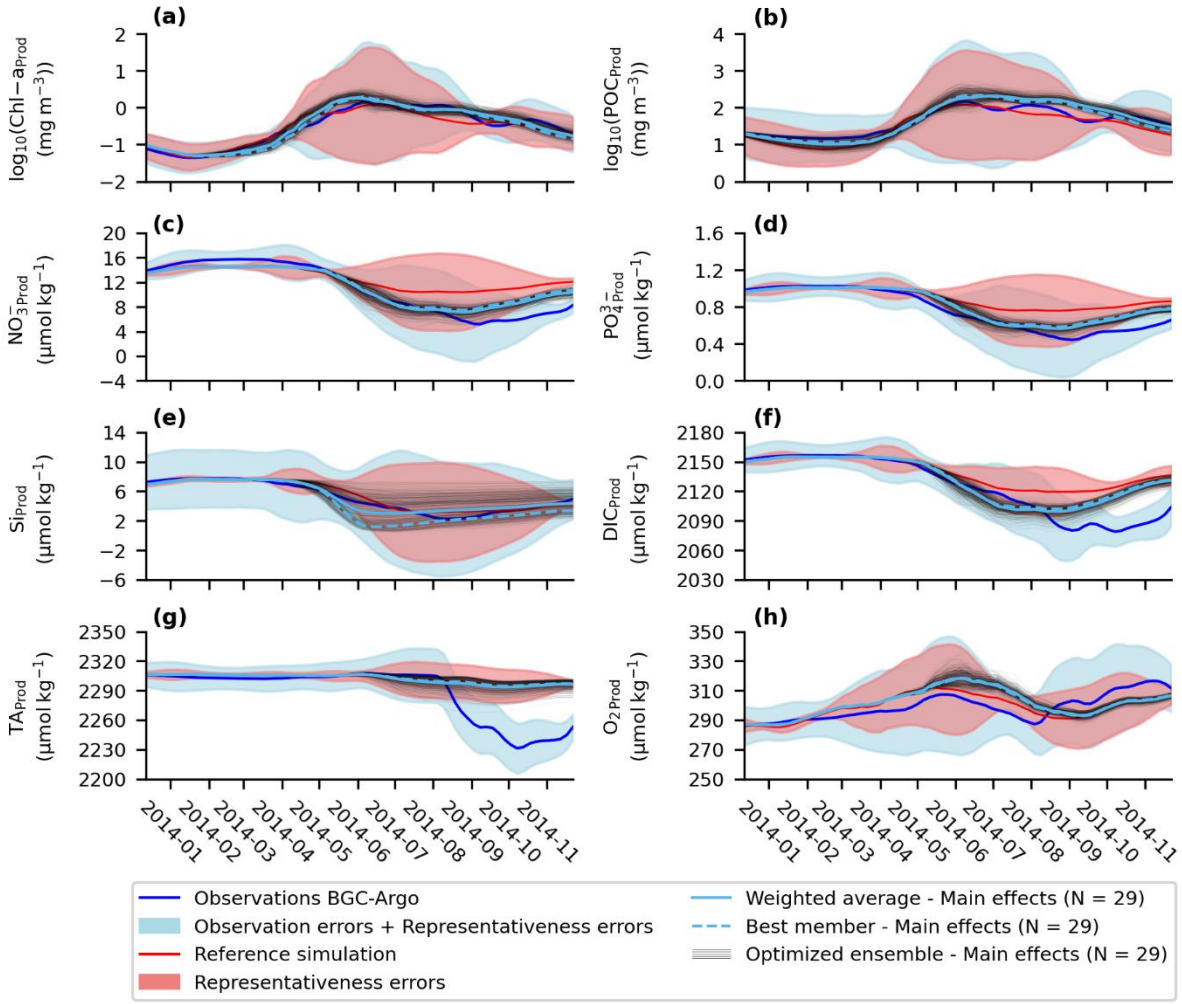

Figure S14. Seasonal cycle of assimilated metrics in the productive layer. Panels show : (**a**) $\log_{10}(\text{Chl-a}_{\text{Prod}})$, (**b**) $\log_{10}(\text{POC}_{\text{Prod}})$, (**c**) $\text{NO}_{3\,\text{Prod}}^{-}$, (**d**) $PO_{4\,\text{Prod}}^{3-}$, (**e**) Si_{Prod}, (**f**) DIC_{Prod}, (**g**) TA_{Prod}, and (**h**) $\text{O}_{2\,\text{Prod}}$. The blue curve represents observations from BGC-Argo float #6901485, with the blue shading indicating the combined observations and representativity errors. The red curve corresponds to the reference simulation from PISCES-1D, with the red shading representing representativity errors. Blue line indicate the weighted means of the ensemble optimized using the Main effects parameters. The black curves represent the simulations of this ensemble. A six-point moving average was applied to all time series to smooth short-term fluctuations.

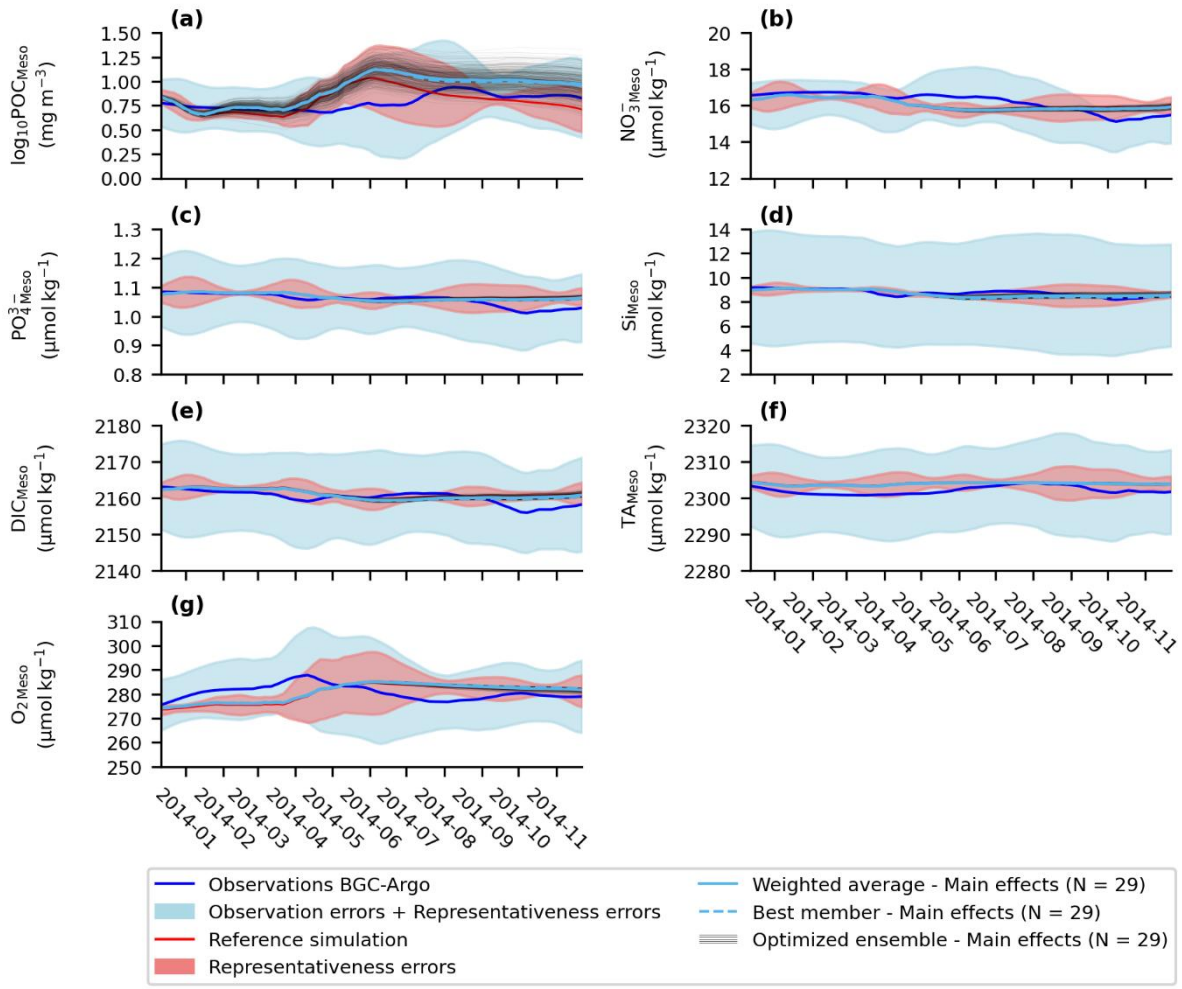

Figure S15. Seasonal cycle of assimilated metrics in the mesopelagic layer. Panels show : (**a**) $\log_{10}(\mathrm{POC_{Meso}})$ (**b**) $\mathrm{NO_{3}^{-}}_{\mathrm{Meso}}$, (**c**) $PO_4^{3-}{}_{\mathrm{Meso}}$, (**d**) $\mathrm{Si_{Meso}}$, (**e**) $\mathrm{DIC_{Meso}}$, (**f**) $\mathrm{TA_{Meso}}$, and (**g**) $\mathrm{O_{2}}_{\mathrm{Meso}}$. The blue curve represents observations from BGC-Argo float #6901485, with the blue shading indicating the combined observations and representativity errors. The red curve corresponds to the reference simulation from PISCES-1D, with the red shading representing representativity errors. Blue line indicate the weighted means of the ensemble optimized using the Main effects parameters. The black curves represent the simulations of this ensemble. A six-point moving average was applied to all time series to smooth short-term fluctuations.

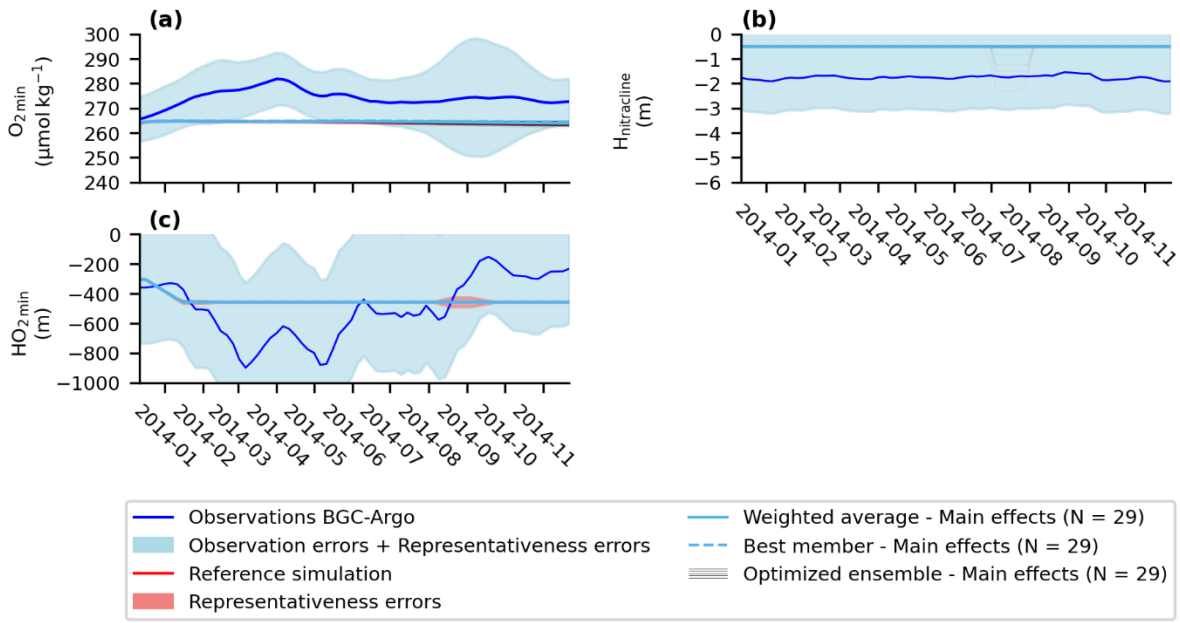

Figure S16. Seasonal cycle of assimilated emerging metrics. Panels show : (**a**) $O_{2_{min}}$, (**b**) $H_{Nitracline}$, (**c**) $HO_{2_{min}}$. Chl_{DCM} and H_{DCM} are not shown, as there were not enough DCM observations to reconstruct these metrics. The blue curve represents observations from BGC-Argo float #6901485, with the blue shading indicating the combined observations and representativity errors. The red curve corresponds to the reference simulation from PISCES-1D, with the red shading representing representativity errors. Blue line indicate the weighted means of the ensemble optimized using the Main effects parameters. The black curves represent the simulations of this ensemble. A six-point moving average was applied to all time series to smooth short-term fluctuations.

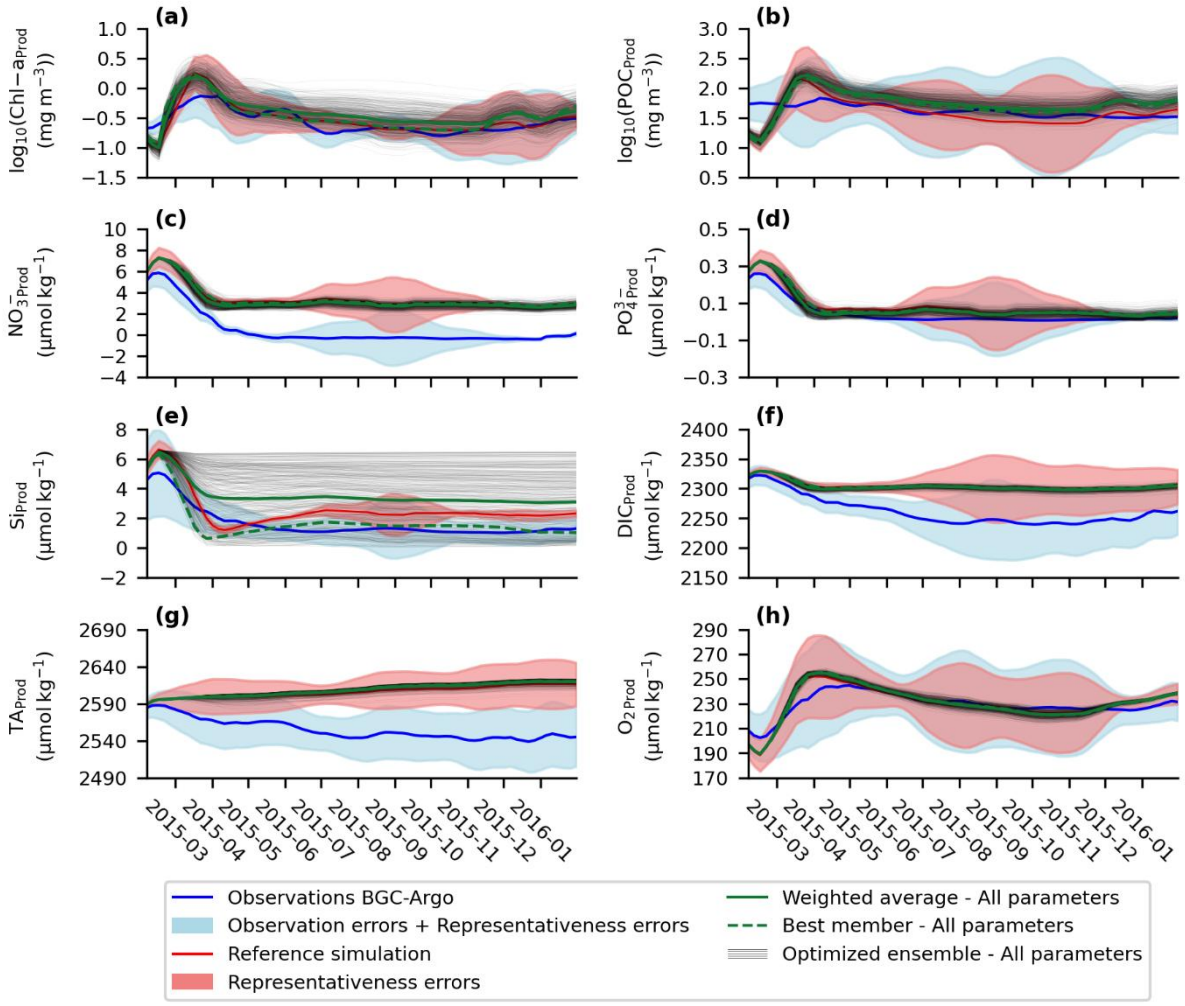

Figure S17. Seasonal cycle of assimilated metrics in the productive layer. Panels show : (**a**) $\log_{10}(\text{Chl-a}_{\text{Prod}})$, (**b**) $\log_{10}(\text{POC}_{\text{Prod}})$, (**c**) $\text{NO}_{3\,\text{Prod}}^{-}$, (**d**) $PO_{4}^{3-}{}_{\text{Prod}}$, (**e**) Si_{Prod}, (**f**) DIC_{Prod}, (**g**) TA_{Prod}, and (**h**) $\text{O}_{2\,\text{Prod}}$. The blue curve represents observations from BGC-Argo float #6901648, with the blue shading indicating the combined observations and representativity errors. The red curve corresponds to the reference simulation from PISCES-1D, with the red shading representing representativity errors. Green line indicate the weighted means of the ensemble optimized using all parameters of the PISCES model. The black curves represent the ensemble of selected members obtained by optimizing all parameters of the PISCES model. A six-point moving average was applied to all time series to smooth short-term fluctuations.

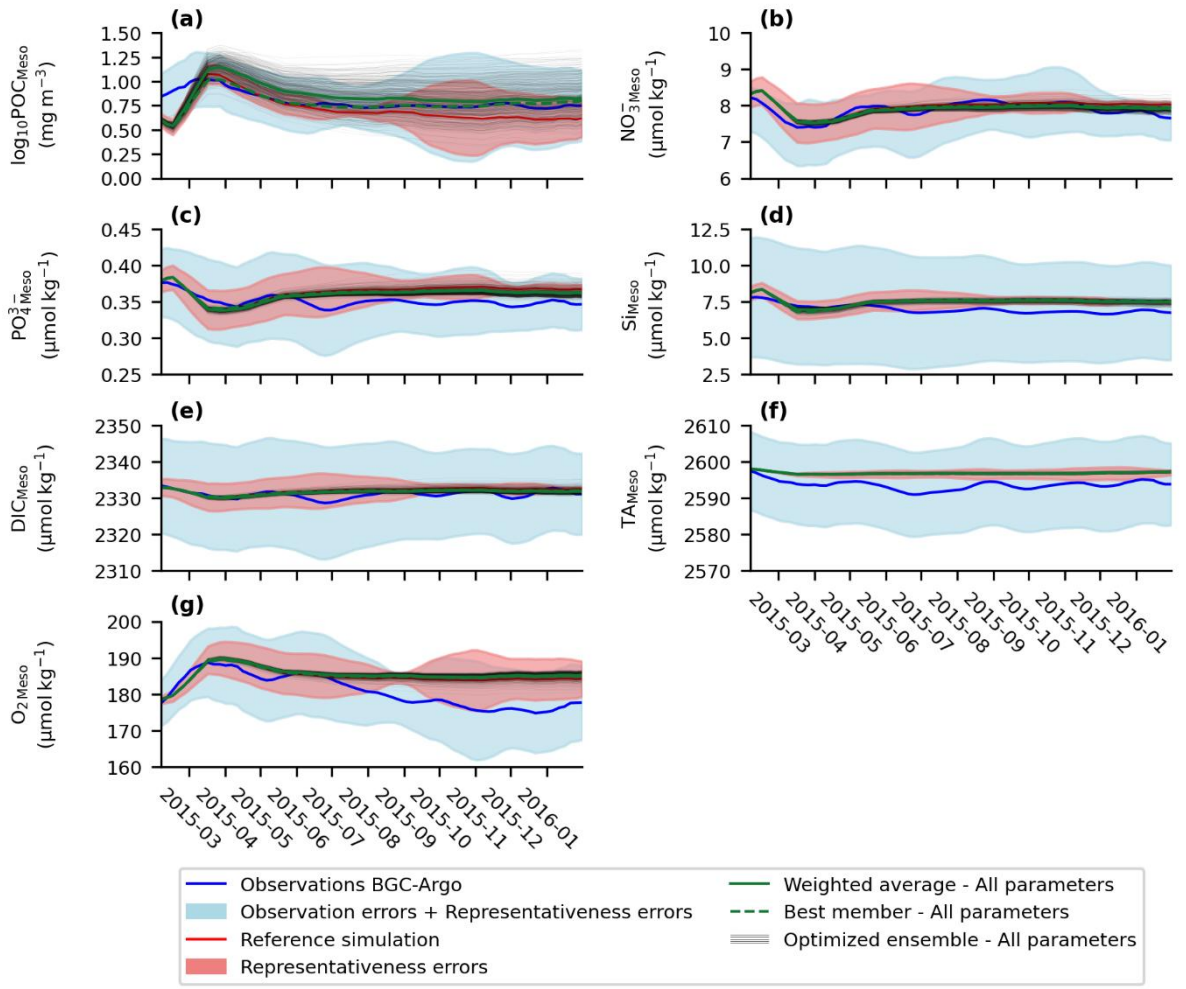

Figure S18. Seasonal cycle of assimilated metrics in the mesopelagic layer. Panels show : (**a**) $\log_{10}(\mathrm{POC}_{\mathrm{Meso}})$ (**b**) $\mathrm{NO}_{3\,\mathrm{Meso}}^{-}$, (**c**) $PO_{4}^{3-}{}_{\mathrm{Meso}}$, (**d**) $\mathrm{Si}_{\mathrm{Meso}}$, (**e**) $\mathrm{DIC}_{\mathrm{Meso}}$, (**f**) $\mathrm{TA}_{\mathrm{Meso}}$, and (**g**) $\mathrm{O}_{2\,\mathrm{Meso}}$. The blue curve represents observations from BGC-Argo float #6901648, with the blue shading indicating the combined observations and representativity errors. The red curve corresponds to the reference simulation from PISCES-1D, with the red shading representing representativity errors. Green line indicate the weighted means of the ensemble optimized using all parameters of the PISCES model. The black curves represent the ensemble of selected members obtained by optimizing all parameters of the PISCES model. A six-point moving average was applied to all time series to smooth short-term fluctuations.

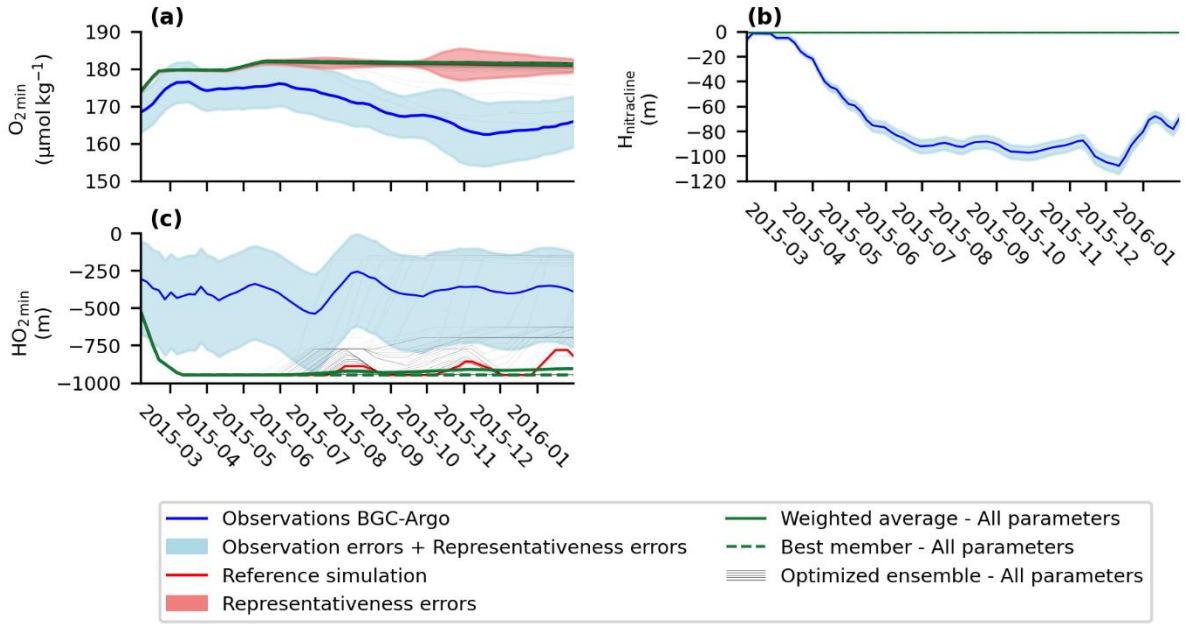

Figure S19. Seasonal cycle of assimilated emerging metrics. Panels show : (**a**) $O_{2_{min}}$, (**b**) $H_{Nitracline}$, (**c**) $HO_{2_{min}}$. Chl_{DCM} and H_{DCM} are not shown, as there were not enough DCM observations to reconstruct these metrics. The blue curve represents observations from BGC-Argo float #6901648, with the blue shading indicating the combined observations and representativity errors. The red curve corresponds to the reference simulation from PISCES-1D, with the red shading representing representativity errors. Green line indicate the weighted means of the ensemble optimized using all parameters of the PISCES model. The black curves represent the ensemble of selected members obtained by optimizing all parameters of the PISCES model. A six-point moving average was applied to all time series to smooth short-term fluctuations.

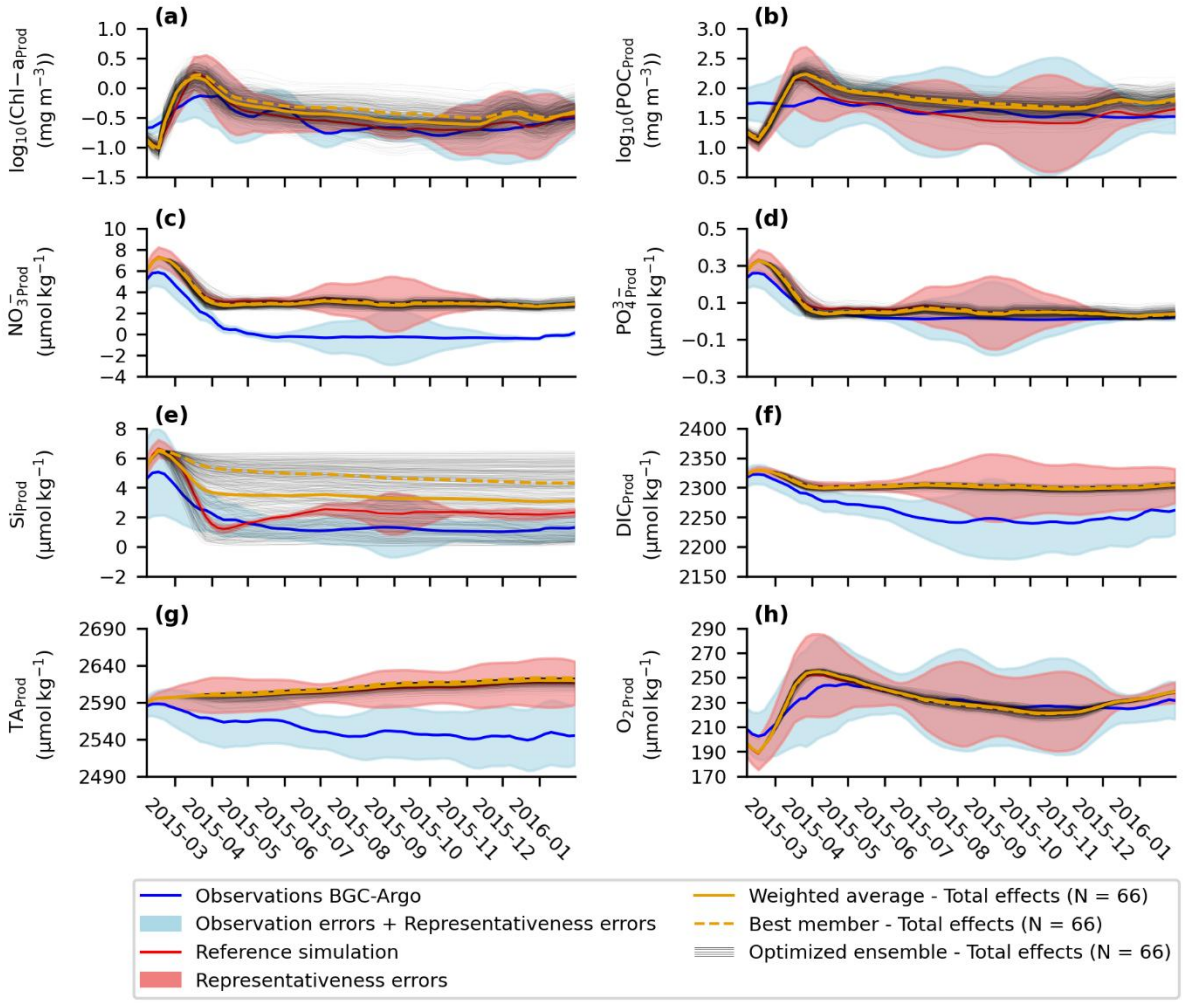

Figure S20. Seasonal cycle of assimilated metrics in the productive layer. Panels show : (**a**) $\log_{10}(\text{Chl-a}_{\text{Prod}})$, (**b**) $\log_{10}(\text{POC}_{\text{Prod}})$, (**c**) $\text{NO}_{3\,\text{Prod}}^{-}$, (**d**) $PO_{4\,\text{Prod}}^{3-}$, (**e**) Si_{Prod}, (**f**) DIC_{Prod}, (**g**) TA_{Prod}, and (**h**) $\text{O}_{2\,\text{Prod}}$. The blue curve represents observations from BGC-Argo float #6901648, with the blue shading indicating the combined observations and representativity errors. The red curve corresponds to the reference simulation from PISCES-1D, with the red shading representing representativity errors. Orange line indicate the weighted means of the ensemble optimized using the Total effects parameters. The black curves represent the simulations of this ensemble. A six-point moving average was applied to all time series to smooth short-term fluctuations.

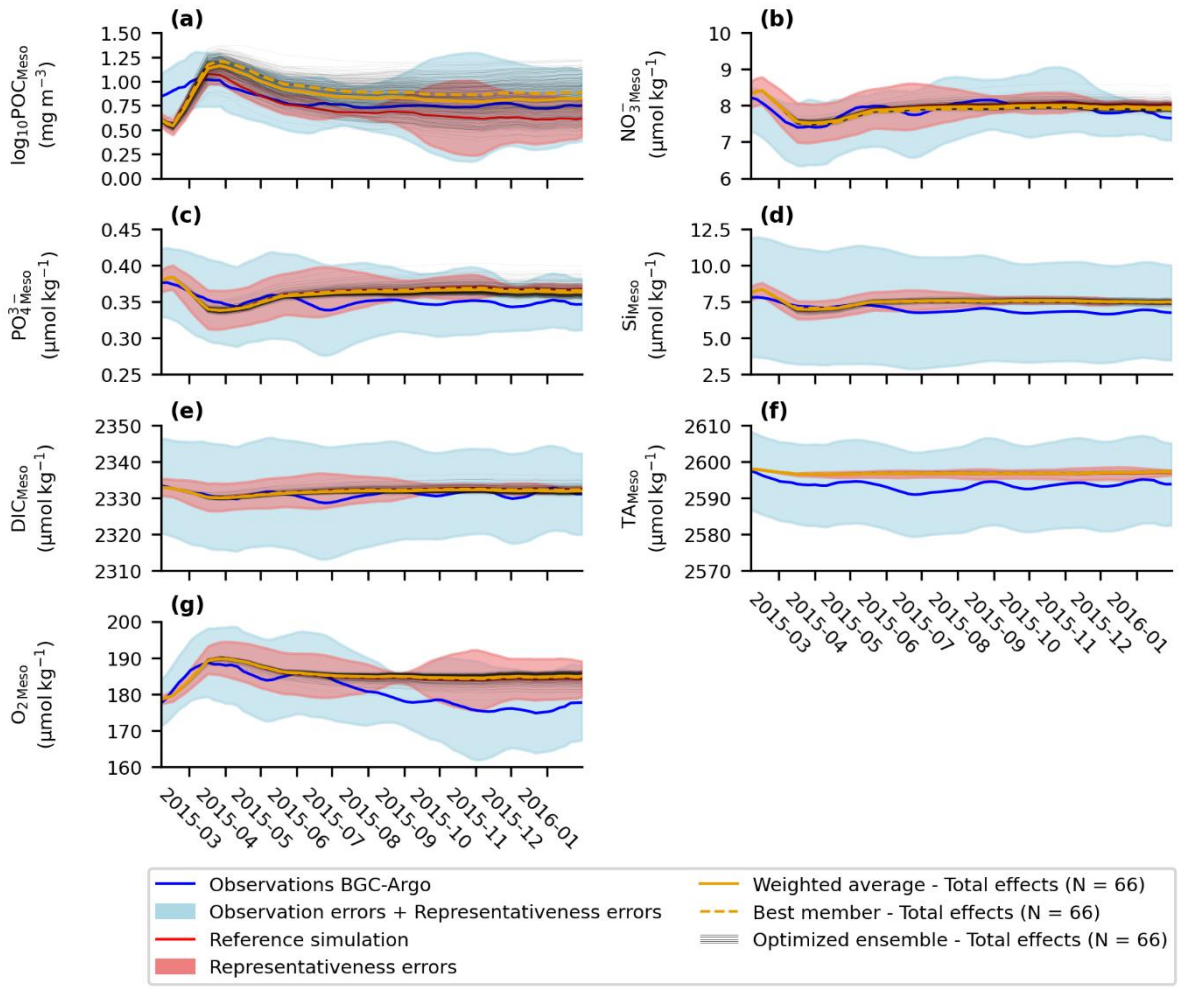

Figure S21. Seasonal cycle of assimilated metrics in the mesopelagic layer. Panels show : (**a**) $\log_{10}(\mathrm{POC_{Meso}})$ (**b**) $\mathrm{NO_{3}^{-}}_{\mathrm{Meso}}$, (**c**) $PO_4^{3-}{}_{\mathrm{Meso}}$, (**d**) $\mathrm{Si_{Meso}}$, (**e**) $\mathrm{DIC_{Meso}}$, (**f**) $\mathrm{TA_{Meso}}$, and (**g**) $\mathrm{O_{2}}_{\mathrm{Meso}}$. The blue curve represents observations from BGC-Argo float #6901648, with the blue shading indicating the combined observations and representativity errors. The red curve corresponds to the reference simulation from PISCES-1D, with the red shading representing representativity errors. Orange line indicate the weighted means of the ensemble optimized using the Total effects parameters. The black curves represent the simulations of this ensemble. A six-point moving average was applied to all time series to smooth short-term fluctuations.

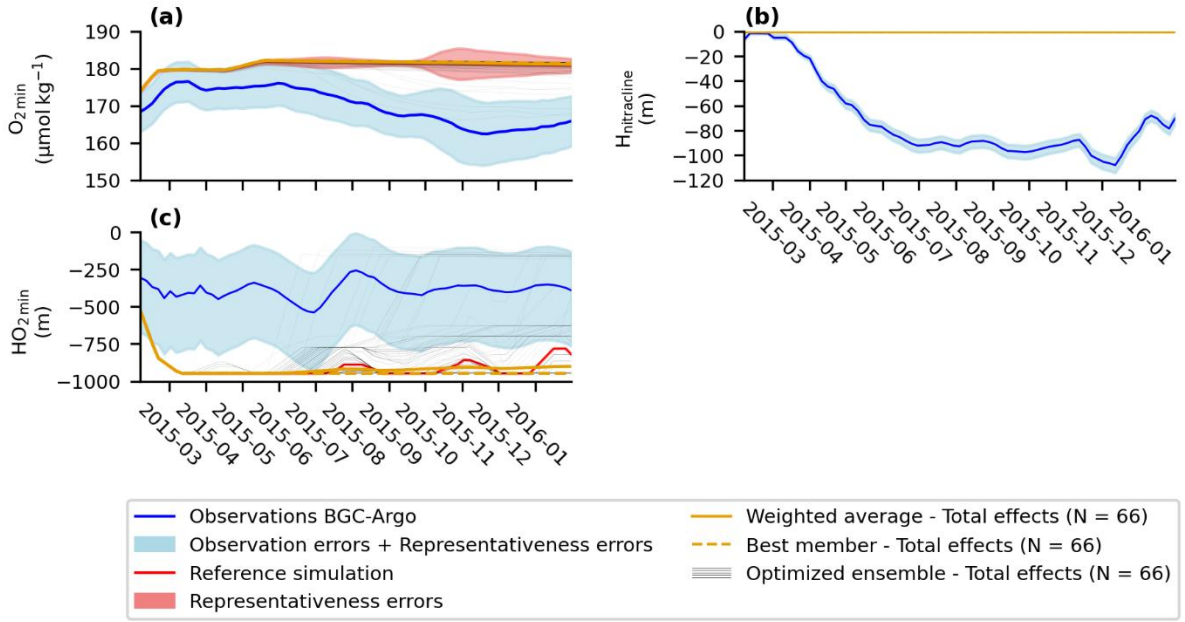

Figure S22. Seasonal cycle of assimilated emerging metrics. Panels show : (**a**) $O_{2_{min}}$, (**b**) $H_{Nitracline}$, (**c**) $HO_{2_{min}}$. Chl_{DCM} and H_{DCM} are not shown, as there were not enough DCM observations to reconstruct these metrics. The blue curve represents observations from BGC-Argo float #6901648, with the blue shading indicating the combined observations and representativity errors. The red curve corresponds to the reference simulation from PISCES-1D, with the red shading representing representativity errors. Orange line indicate the weighted means of the ensemble optimized using the Total effects parameters. The black curves represent the simulations of this ensemble. A six-point moving average was applied to all time series to smooth short-term fluctuations.

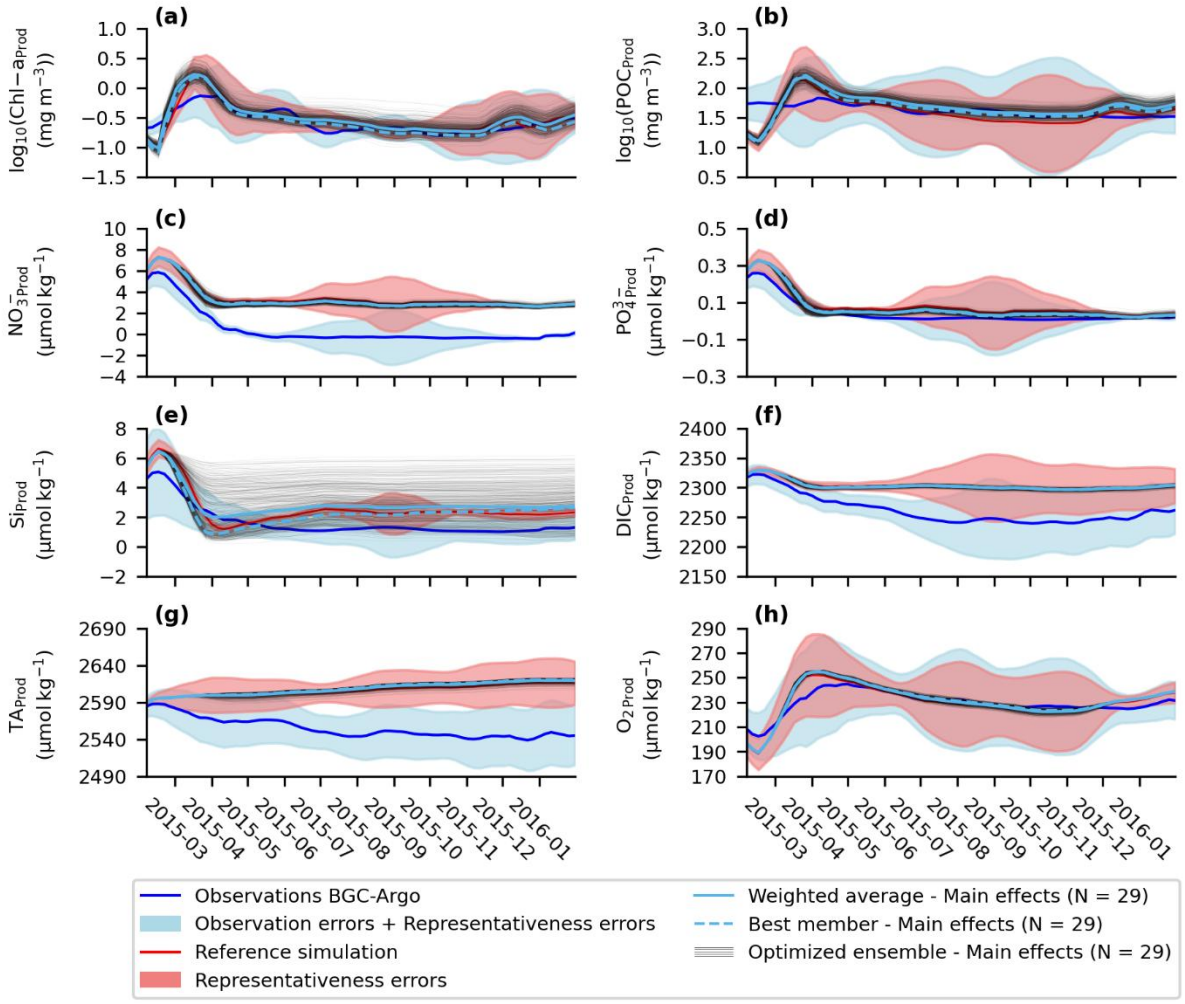

Figure S23. Seasonal cycle of assimilated metrics in the productive layer. Panels show : (**a**) $\log_{10}(\text{Chl-a}_{\text{Prod}})$, (**b**) $\log_{10}(\text{POC}_{\text{Prod}})$, (**c**) $\text{NO}_{3\,\text{Prod}}^{-}$, (**d**) $PO_{4\,\text{Prod}}^{3-}$, (**e**) Si_{Prod}, (**f**) DIC_{Prod}, (**g**) TA_{Prod}, and (**h**) $\text{O}_{2\,\text{Prod}}$. The blue curve represents observations from BGC-Argo float #6901648, with the blue shading indicating the combined observations and representativity errors. The red curve corresponds to the reference simulation from PISCES-1D, with the red shading representing representativity errors. Blue line indicate the weighted means of the ensemble optimized using the Main effects parameters. The black curves represent the simulations of this ensemble. A six-point moving average was applied to all time series to smooth short-term fluctuations.

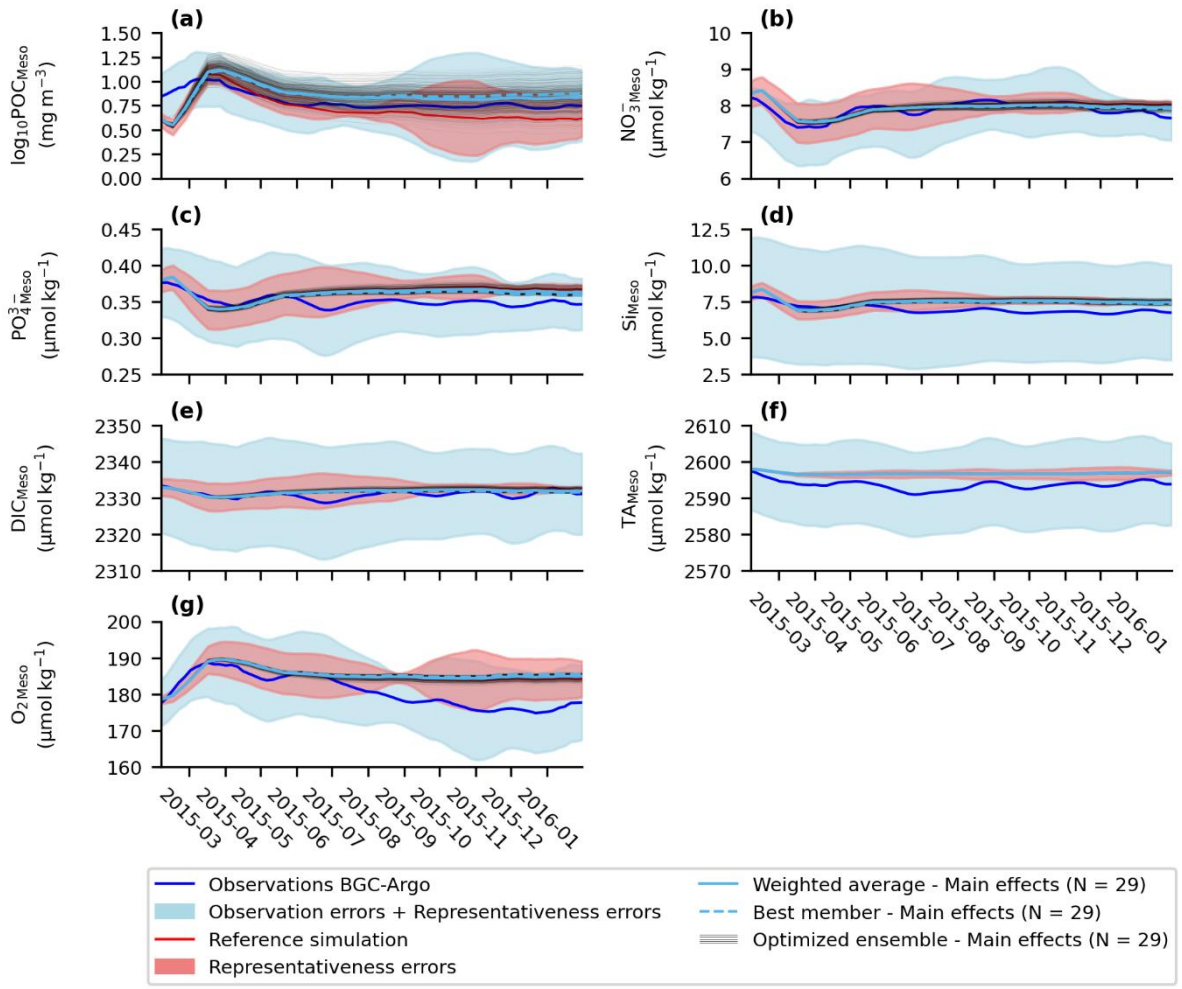

Figure S24. Seasonal cycle of assimilated metrics in the mesopelagic layer. Panels show : (**a**) $\log_{10}(\mathrm{POC}_{\mathrm{Meso}})$ (**b**) $\mathrm{NO}_{3\,\mathrm{Meso}}^{-}$, (**c**) $PO_{4}^{3-}{}_{\mathrm{Meso}}$, (**d**) $\mathrm{Si}_{\mathrm{Meso}}$, (**e**) $\mathrm{DIC}_{\mathrm{Meso}}$, (**f**) $\mathrm{TA}_{\mathrm{Meso}}$, and (**g**) $\mathrm{O}_{2\,\mathrm{Meso}}$. The blue curve represents observations from BGC-Argo float #6901648, with the blue shading indicating the combined observations and representativity errors. The red curve corresponds to the reference simulation from PISCES-1D, with the red shading representing representativity errors. Blue line indicate the weighted means of the ensemble optimized using the Main effects parameters. The black curves represent the simulations of this ensemble. A six-point moving average was applied to all time series to smooth short-term fluctuations.

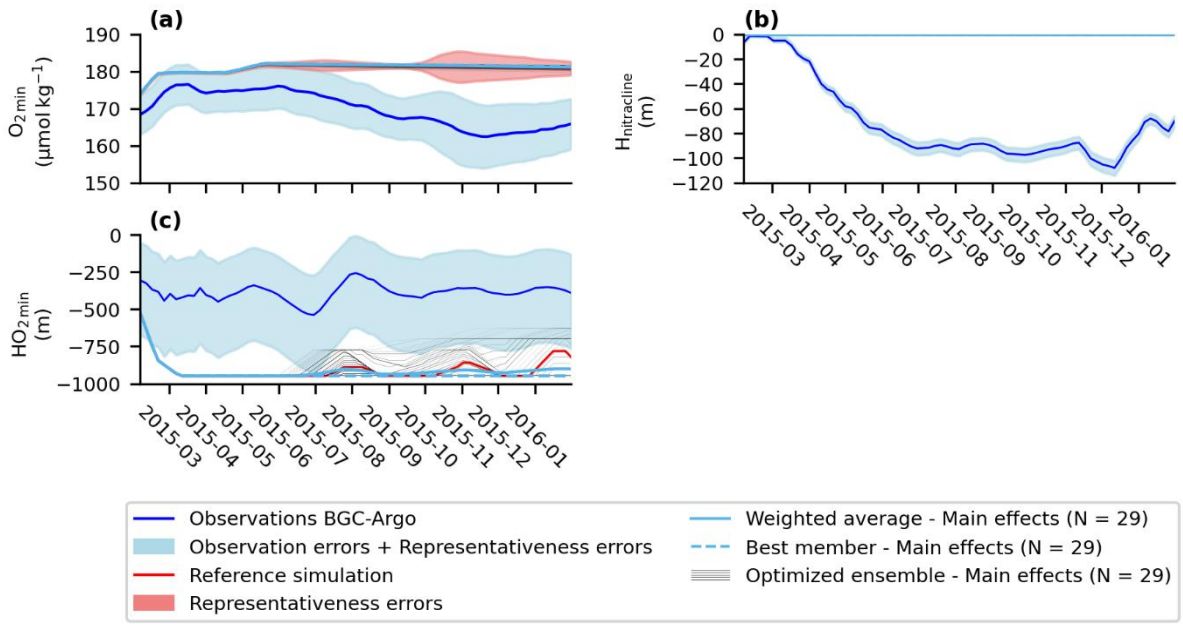

Figure S25. Seasonal cycle of assimilated emerging metrics. Panels show : (**a**) $O_{2_{min}}$, (**b**) $H_{Nitracline}$, (**c**) $HO_{2_{min}}$. Chl_{DCM} and H_{DCM} are not shown, as there were not enough DCM observations to reconstruct these metrics. The blue curve represents observations from BGC-Argo float #6901648, with the blue shading indicating the combined observations and representativity errors. The red curve corresponds to the reference simulation from PISCES-1D, with the red shading representing representativity errors. Blue line indicate the weighted means of the ensemble optimized using the Main effects parameters. The black curves represent the simulations of this ensemble. A six-point moving average was applied to all time series to smooth short-term fluctuations.