Letter

Neural Network Approaches to Reconstruct Phytoplankton Time-Series in the Global Ocean

Elodie Martinez 1, *, Anouar Brini 1, Thomas Gorgues 1, Lucas Drumetz 2, Joana Roussillon 1, Pierre Tando 2, Guillaume Maze 1 and Ronan Fablet 2

1 Laboratoire d’Océanographie Physique et Spatiale (LOPS), IUEM, Univ. Brest-CNRS-IRD-Ifremer, 29200 Brest, France; anouar.brini@supcom.tn (A.B.); thomas.gorgues@ird.fr (T.G.); Joana.Roussillon@etudiant.univ-brest.fr (J.R.); Guillaume.Maze@ifremer.fr (G.M.)

2 IMT Atlantique, Lab-STIC UMR CNRS 6285, 29200 Brest, France; lucas.drumetz@imt-atlantique.fr (L.D.); pierre.tandeo@imt-atlantique.fr (P.T.); ronan.fablet@imt-atlantique.fr (R.F.)

* Correspondence: elodie.martinez@ird.fr

Received: 27 November 2020; Accepted: 16 December 2020; Published: date

Supplementary material
Figure S1. MLP architecture.

Table S1. MLP configuration.

| Batch size | Epochs  | Optimizer                                                                 | Learning rate | Loss |
|------------|---------|---------------------------------------------------------------------------|---------------|------|
| 256        | 200     | with EarlyStopping (i.e., monitor='val_loss'; mode='min'; patience=150)    | 0.001         | MSE  |
|            |         | Adam with its default parameters (lr = 0.001; beta1 = 0.9; beta2 = 0.999; epsilon=1e-07; amsgrad=False) |               |      |
Figure S2. Learning curves of left) Chl\textsubscript{MLP-9%} and right) Chl\textsubscript{MLP}.

Figure S3. Scatter plots of log of Chl\textsubscript{MLP} trained on 80% of the dataset but only for predictors with a relative importance higher than 0.1 in Table 2, for each oceanic basin between 50°S and 50°N and over 1998–2015. The Chl\textsubscript{OC-CCI} vs. Chl\textsubscript{MLP} regression lines are plotted in black and the 1:1 regression lines are plotted in red. The figure is color-coded according to the density of observations.

Figure S4. (Left) Correlation and (Right) NRMSE of Chl\textsubscript{OC-CCI} vs. Chl\textsubscript{MLP} trained on 80% of the dataset but only for predictors with a relative importance higher than 0.1 in Table 2, over 1998-2015.

© 2020 by the authors. Licensee MDPI, Basel, Switzerland. This article is an open access article distributed under the terms and conditions of the Creative Commons Attribution (CC BY) license (http://creativecommons.org/licenses/by/4.0/).