Correction of the chlorophyll-a concentration profile in the Black Sea: in situ measurements and measurements from bio-argo floats

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Goal
Using current available data on chlorophyll-a concentration profiles, including in situ measurements and measurements from bio-argo floats, to make a correction of the relationship between chlorophyll-a concentration in the upper layer of the Black Sea and its profile with depth, obtained earlier from the results of long-term field data summarizing [Finenko et al., 2005].

Data
634 profiles from three bio-argo floats:
- PI Violeta Slabakova (basbio001d)
- PI Pierre-Marie Poulain (Argo-Italy ogsbio007c)
- PI Sorin Balan (GeoECoMar gembio001b)

In situ measurements from scientific expeditions:
- RV Pr.Vodyanitsky-70 (August 2011) (Warm: 9 profiles)
- RV Pr.Vodyanitsky-78 (November-December 2014) (Cool: 17 profiles)

Method

\begin{align*}
\text{relative error of the integral profile} & = \frac{|I(\text{model}) - I(\text{float})|}{I(\text{float})} \\
\text{relative error taking into account profile features} & = \sum \frac{|C_i(h, \text{model}) - C_i(h, \text{float})|}{C_i(h, \text{float})} \times \frac{1}{w(h, \text{float})} \\
\end{align*}

TUNING: BIO-ARGO FLOATS

![Figure Old (F) and New (N) parameters of the Chla profile. (C) and (W) are float's profiles for Cool and Warm periods, respectively.](image)

Conclusion: the corrected expression for the recovery of the chlorophyll-a concentration profile by its value in the upper layer of the Black Sea for all seasons has obtained.

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