Parameterizing the natural fluorescence kinetics of Thalassiosira weissflogii

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ABSTRACT: We examined variability in the natural fluorescence yield of a neritic diatom, *Thalassiosira weissflogii*, in continuous cultures. In this species, kinetics in natural fluorescence yield over time scales less than a photoperiod were characterized by sharp decreases, occurring at irradiance intensities that presumably coincide with the onset of nonphotochemical fluorescence quenching by interconvertible xanthophylls. The irradiance at which these decreases occurred, and the concomitant degree of quenching involved, varied systematically in these cultures as a function of dilution rate and irradiance intensity, independent of biomass. Similar diurnal kinetics in natural fluorescence yield were observed in phytoplankton assemblages in a coastal transition region in the Gulf of Alaska. An empirical parameterization was developed to quantify these diurnal kinetics in terms of the magnitude of this increased quenching and the irradiance at which it occurred, in order to track the behavior of these kinetics over longer time scales of days to weeks.