**Supplementary Methods**

As outlined in the main text, models are geostatistical and based on a stochastic partial differential equations (SPDE) mesh. The mesh generated for these models included 200 knots for all models, including null, depth-time only and full models (see Table 1). The general model form can be represented as

where represents the observed biomass density at a point in space and time . The index represents a month. The symbol represents the mean and and represent the Tweedie power and dispersion parameters. The symbol represent a vector of predictors for that location in time and represents a corresponding vector of coefficients; many of the coefficients correspond to basis functions from the smooth terms. The symbol represent spatiotemporal random effects drawn from Gaussian Markov random fields with covariance matrices and . The spatiotemporal random fields are allowed to follow a first order autoregressive structure (AR1) by month. The marginal standard deviation of is defined as.