We modelled the response (catch per unit effort [CPUE] at point in space and time ) with a Tweedie distribution and a log link \citep{tweedie1984, dunn2005, anderson2019synopsis}

where represents the mean, represents the power parameter, and represents the dispersion parameter. The parameters represent means for each year, and and represent coefficients for log depth () and log depth squared (). The symbols and represent spatial and spatiotemporal random effects drawn from Gaussian Markov random fields \citep{cressie2011} with covariance matrices and . The symbol represents the spatially varying coefficients that represent local trends through time also drawn from Gaussian Markov random fields. All three random fields have covariance matrices constrained by Matérn covariance functions with independent scales but shared parameters controlling the rate of decay of spatial correlation with distance \citep{cressie2011}.

Something about mesh \citep{rue2009, lindgren2011} …

something about optimization and REML …

anisotropy …

with the package sdmTMB \citep{anderson2019synopsis, sdmTMB}, which interfaces automatic differentiation in Template Model Builder \citep{kristensen2016} with INLA \citep{rue2009}