Modelling the distribution of fish accounting for spatial correlation and overdispersion - DTU Orbit (23/02/2019)

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The spatial distribution of cod (Gadus morhua) in the North Sea and the Skagerrak was analysed over a 24-year period using the Log Gaussian Cox Process (LGCP). In contrast to other spatial models of the distribution of fish, LGCP avoids problems with zero observations and includes the spatial correlation between observations. It is therefore possible to predict and interpolate unobserved densities at any location in the area. This is important for obtaining unbiased estimates of stock concentration and other measures depending on the distribution in the entire area. Results show that the spatial correlation and dispersion of cod catches remained unchanged during winter throughout the period, in spite of a drastic decline in stock abundance and a movement of the centre of gravity of the distribution towards the northeast in the same period. For the age groups considered, the concentration of the stock was found to be constant or declining in the period. This means that cod does not follow the theory of density-dependent habitat selection, as the concentration of the stock does not increase when stock abundance decreases.