



Diurnal variation models of bottom trawl survey catches parameterised by using commercial CPUE data



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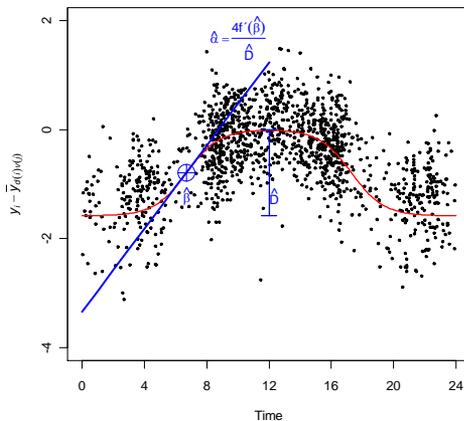
Introduction:

Diurnal variation is observed in almost all marine surveys and can cause biased abundance and length frequency estimates. Symmetric logistic models developed by Hjellvik et al. (2001) were utilized to investigate diurnal variation in catch rates of hake (*Merluccius spp.*) of trawlers for the period 1997-2002 and of hake surveys (1990-2003) in Namibian waters. The large numbers of commercial tows have a very good geographical, seasonal and temporal resolution that enabled us to study the influence of various explanatory variables on diurnal fluctuation model parameters. These results were thereby used to facilitate the modelling of diurnal variation in Namibian hake trawl survey catches.

RESULTS:

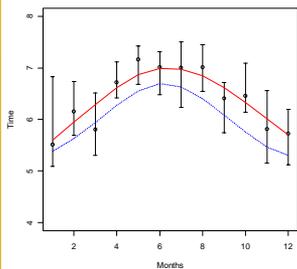
The analyses of the commercial CPUE data strongly suggest that catch rates of hake are time and light dependent and reach maximum around noon. There are no obvious reasons why the observed density and depth dependencies of the diurnal bias should not apply for the survey catch rates. The weak fluctuation in the survey catch rates is therefore probably an artefact that is caused by a semi-systematic survey design that result in non-adequate mean adjusted catch rates.

Catch rates were highest at noon



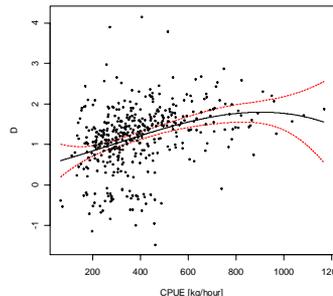
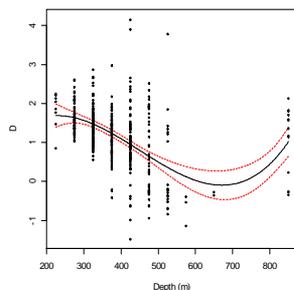
Model: The CPUE [kg/hour] values were log transformed and mean adjusted by vessel and day (by depth and latitude defined strata for the survey data). The parameters of the difference between day and night catch rates (D), the swiftness of the transition from night to day (α) and the time of the transition (β) were estimated

Transition time was correlated to sunrise

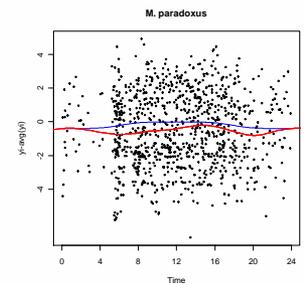


The median of estimated transition times with 95% conf. int. (error bars) fitted with a smoothed curve (dotted blue) plotted against the time of sunrise

Diurnal amplitude (D) decreased with depth and increased with catch rate of hake



The diurnal variation models of survey catch rates converged with a fixed α (0.95) and β values estimated from average sunrise time



Parametric and non-parametric estimates of the diurnal variation for non-zero catches of *M. paradoxus*.