

**Estimating fishery dynamic and its relation to changing environments to support ecosystem-based fisheries management.**

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Ecosystem based fisheries management requires understanding fishery dynamic and behavior with focus on long-term trends and regime shifting. Fisheries data assembly includes some quality and quantity variables on each trawl operation, including: year, month, vessel and its Flag State, gear type, hauling duration, catch, area of vessel locations and others. The authors propose to analyze fishery data as multivariable system to reveal adequate information for management advisory activity. The authors study the structure of spatial distribution and temporal dynamic of standardized CPUE index as the most important fishery indicator. The method of CPUE standardization based on the generalized linear models with mixed effect (GLMM) is used. The advantages of GLMM are possibility to analyze differences in CPUE dynamics by time and in various hierarchies of spatial units (subdivisions, statistical rectangles, local fishing area and others). It is shown availability of applying Markov Regime Switching Models, Multiscale analysis and modeling using wavelets to investigate time series of fishery and environments. It is highlighted availability to estimate the long-term trends and regime shifting of fishery and its relation to ongoing climate changing as well as to predict expected changes in fishery regime in the years to come. The practical application of proposed data processing is presented under analysis of long-term trends of Antarctic krill fishery. Time series of AAO index (Antarctic Oscillation Index) and index of the zonal atmospheric transports were used as the indications of inter-annual and long-period fluctuations of hydrometeorological conditions at high latitudes of the southern hemisphere.

**Key words:** multivariable fishery and environmental time series data, long-term trends and regime shifting.

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