ABSTRACT

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FISHERIES MANAGEMENT: DEVELOPING AN ENVIRONMENTALLY DRIVEN - PROCESS COUPLED - PREDICTIVE CAPABILITY (ED2P2C) FOR THE SOUTH AFRICAN SQUID FISHERY

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All fisheries are influenced to some extent by perturbations in the environment. Many of these perturbations can be linked to El Niño-Southern Oscillation events (ENSO). In South Africa, the first fishery to be impacted by such perturbations is the hand-jigged, labour intensive, chokka fishery of the Eastern Cape. In this fishery, environmental perturbations cause immediate, often large, fluctuations in catches, the proportional range and frequency of which, are greater than that experienced in other fisheries. For example, in 1988-89, some 10 000 tons of chokka were caught fetching R 100 million, however, in 1992 catches dropped to a quarter of this. Needless to say, that poor catches such as the above, negatively impact not only the industry but also, and to a greater extent, the lives of the 4 000 informally employed fishermen and their families. In this paper, an overview is given of a methodology and model, currently being developed by the Sea Fisheries Research Institute, to lessen the impact of environmental perturbations. Referred to as an Environmentally Driven Predictive Capability (EDPC), it is aimed at providing long-range forecasts (1 year) of monthly chokka catches. The model, when complete, will not only be used to adjust effort control by fisheries managers but also used by the South African squid fishing forum to forewarn the industrial sector and fishing community of poor seasons so that appropriate social and economic strategies can be implemented, well in advance, to lessen the impact.

To realise the EDPC, a multi-disciplinary research approach is necessary. Five programmes (modules) were initiated, the first in 1991. Three of these address understanding and modelling the oceanography, the atmospheric driving forces, and the regional, long-range, forecast of synoptic pressure fields using Global Circulation Models (GCM's). The forth module which seeks a relationship between the oceanography and behaviour of spawning chokka, and hence catches, involves acoustic telemetry experiments, diving-camera studies and CPUE studies on spawning aggregations of chokka. The newest thrust, and perhaps the most relevant, is module (5) which is the extension and implementation of the EDPC into the fishing industry and community. Its aim is first to understand, in a quantitative manner, the impact that chokka catch fluctuations have on the industrialised sector of the fishery, as well as, the fishing community, and having established this, methods must be found to lessen the impacts of poor fishing seasons. Despite steady progress being made in each module, it is clear that we are still some years from the completed EDPC product. The realisation of the EDPC is ultimately going to depend on (1) the ability of GCM's to reliably forecast extra-tropical climate variability, and (2) determining a satisfactory quantitative relationship between squid catches, water temperatures and benthic turbidity. The usefulness of the EDPC will depend on the forecast range.