

## ABSTRACT

Roberts, M.J. (1997).

### **How can we predict major squid population trends and catches from environmental change?**

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At the outset of the planning for this workshop, I was informed (by an eminent fisheries biologist) that the above is the title of my paper. My immediate response was repulsion because to me, as an oceanographer, it was too categorical. However, upon reflection, I became more impressed because it implicitly implied the following. First, that this biologist is taking climate change seriously (I assume he is primarily referring to short-term change i.e. inter-seasonal-annual). Secondly, and most importantly, that he believes, intuitively, the environment has a significant impact on the life cycle process. And thirdly, fisheries managers need this capability – all of which, are crucial to the title topic and therefore serve as a good means of introduction to my paper.

We begin by addressing point 3 because obtaining the capability of prediction is usually time consuming, difficult and a costly exercise. Although, ultimately, the decision to go this route is political, we can I believe, justify this expense on socio-economic grounds – which after all is the essence of fisheries. Because of time and budgetary constraints, the usual approach taken by modelers is what can be referred to as the *Black Box*. This entails seeking, simple, direct correlations between easy to measure environmental parameters and abundance/catches. Unfortunately, few cases exist where this approach has been successful. The South African squid fishery is a good example where this approach has not so far succeeded. At first glance associations/coincidences appear to exist between anomalies in jig catches and abnormalities in certain recorded environmental parameters. However, statistical tests indicate that no direct correlation exists, despite applying some smoothing of data. Great frustration is usually experienced at this point (to say the least) because intuitively many of us believe the relationship exists. Going to first principles and reviewing our theoretical understanding of the environment and life cycles provides a clear truth in that we require a greater understanding of the underpinning biological processes, with qualification! With renewed enthusiasm, we then review an approach presently being taken by the South African squid researchers in an attempt to develop a predictive capability.

In essence, this entails identifying the processes underlying the catches namely, spawning (opening up the *Black Box*), quantifying them, and determining their driving forces. These are then related back to regional oceanography, climate, and ultimately General Circulation Models. A framework for a deterministic model is presented a starting point for discussion.