

## **Session F**

### **How does fishing alter marine populations' and ecosystems' sensitivity to climate?**

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The effects of climate and fishing on marine populations and ecosystems have conventionally been considered separately and it has often been suggested, that they should be disentangled from each other. This vision of separable effects suggests that marine populations or ecosystems can respond to exploitation in a similar way under different climate conditions, or alternatively that their response to climate variations remains alike under different exploitation regimes. However, exploitation not only modifies the abundance of targeted or by-catch species but can also affect demographic structure, stock structure, geographical and migration patterns, species composition and trophic pathways. Climate and exploitation undoubtedly interact in their effects, such that not only may climate changes cause failure in a fishery management scheme but also that fishery exploitation may disrupt the ability of a resource population to withstand, or adjust to, climate variations. Evidence has been accumulated to demonstrate that fishing pressure reduces diversity at the population and ecosystem level by (i) reduction of age/size composition, (ii) depletion/removal of population units, (iii) alteration of life-history traits, and (iv) increase in population/ecosystem turnover rates. Such fishing induced changes can have direct consequences on the way in which climate signal propagates through populations and ecosystems. How much this can affect the resilience of populations/ecosystems to climate effects is still poorly known. Whilst attempts to separate climate induced from fishing induced effects appear as a rather naïve approach, the study of combined effects of climate and exploitation should resolve some of the currently outstanding questions regarding marine populations and ecosystems variability. This situation calls for thorough studies of the interactions of the effects of forcing by climate and fishing. Such studies are indispensable to design appropriate strategies to mitigate the consequences of exploitation and climate on marine resources.

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