Box 3.7 Exploitation of Namibia's deep sea

Several deep-sea species are commercially exploited in the depth range of 500-800 m. The deep-sea red crab *Chaceon maritae* is caught with bottom trawls and pots along the length of the Namibian coast. It was estimated in 1992 that the crab stocks on the fishing grounds amounted to 72 million individuals, or 17 648 metric tons.[64] Annual catches are in the region of 3 tons, although a total catch of 10 tons is allowed. Other exploited deep-sea species include orange roughy *Hoplostethus atlanticus* and alfonsino *Beryx splendens*, which are currently both caught on an experimental basis. These are slow-growing, long-lived species which take decades to reach sexual maturity. Commercial exploitation of orange roughy off New Zealand has led to the collapse of the stocks, and extreme vigilance is needed to ensure that this does not happen here.

The deep-sea red crab *Chaceon maritae* is an abundant demersal species off the shelf of Namibia. It occurs on muddy substrata up to a depth of 950 m, but most commonly between 300 and 700 m. The average crab density over the entire Namibian fishing ground was calculated to be 98.4/ha by Beyers,[64] but densities can be as high as 227.5/ha. These organisms are doubtless important prey items for numerous other deep-ocean species.

3.4 Overview of Namibian marine biodiversity

Biodiversity in the Namibian marine environment shows several pertinent trends. Most habitats support no endemic species. A few species are endemic to the Benguela system, of which the Namibian waters form a part. Species richness in most habitats is relatively low. This is evident in sandy shore, rocky shore and benthic invertebrates, littoral seaweeds, phytoplankton, fish of the littoral and pelagic habitats, and demersal fish of shelf and slope habitats. In all these cases, richness is lower than in comparable habitats in the southern Benguela system off the west coast of South Africa. In most cases, this low richness is accompanied by high biomass.

There is a well-recognised latitudinal gradient in pattens of global species richness,[2] with highest richness in equatorial regions and lowest richness towards the poles. Namibian marine biodiversity provides an anomaly in this gradient since, in general, species richness is substantially lower than recorded in the more southerly marine habitats off South Africa. In addition, there is a clear trend of decreasing marine species richness from south to north off Namibia, contrary to the expected trend. Why is this?

A given supply of food may be partitioned among many species with narrow diets (specialists) and small populations, or among few species with wider diets (generalists) and large populations. Specialisation is favoured where food availability is predictable and competition may lead to the evolution of specialised feeding behaviour. This is the case in tropical regions, where the high genetic diversity is correlated with trophic stability. In temperate regions, however, where conditions are seasonally variable, food availability is less predictable and organisms may need to feed opportunistically during times of food shortage. Specialisation is thus not as feasible, and resources tend to be partitioned between fewer species with large populations.

Upwelling systems in general are extreme cases of unstable environments, where continuous variation prevents the fine tuning of genotypes to local conditions. Food availability is variable, and generalist feeders are favoured. Such systems predictably support only low species richness, while at the same time being among the most productive habitats in the world.[4] Significantly the Namibian marine environment (particularly the northern Benguela system) is species-poor even by comparison to other upwelling systems, such as the southern Benguela and the west African upwelling systems. This may arise in part due to the intensely dynamic and perennial nature of upwelling off the Namibian coast, which creates extreme instability and unpredictability of numerous environmental factors such as temperature and water chemistry.