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Effect of North Atlantic climate variability on hawksbill turtles in the Southern Gulf of Mexico

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The recent decline of nesting hawksbill turtles (Eretmochelys imbricata) in the southern Gulf of Mexico (SGM) has been partly attributed to climate change, but the evidences to support this idea are still developing. In sea turtles, the recruitment success and remigration interval (the interval between two successive nesting seasons) are related to interannual variations in oceanographic conditions at the turtles' developmental habitats. However, the effect of low-frequency environmental variability has not been well documented. The relative changes in the numbers of nesting hawksbill turtles related to climate variability in the SGM and North Atlantic, during the 1980-2010 period, were analysed using the time series techniques to determine: 1) whether there are periodic signals in the series, and 2) whether any such signals parallel climate variations of similar frequency at local, regional and basin-wide spatial scales. A 7-year cycle in annual relative number of nesting hawksbill turtles in the SGM was found, which is superimposed upon a negative long-term trend. Both signals are inversely correlated with cycles of similar periodicity in the North Atlantic sea surface temperature (SST). These results suggest that the long-term population dynamics of hawksbill turtles in the SGM are related to a basin-wide, quasi-decadal environmental fluctuation in the North Atlantic. This relationship may be in fluenced by trophic interactions that are coupled to a decadal alternation between favourable and unfavourable ecological conditions occurring on basin-wide scales. Conservation planning for this species should focus on the potential effect of both linear increases in SST, as expected from current global warming trend, and long-term natural environmental variability.

Palabras clave: Atlantic Multidecadal Oscillation, Marine populations, Climate cycles, Chelonians