LINKING CIGUATERA POISONING TO CLIMATE OSCILLATIONS: A CASE STUDY FROM RAROTONGA, COOK ISLANDS

Increased resiliency against climate change impact and disaster risk

Ciguatera poisoning is the most reported seafood intoxication globally affecting 50,000–500,000 people annually. The central Pacific Ocean has arguably more ciguatera poisoning than any other place on earth, and ciguatera has over the decades become a critical public-health issue among Pacific island nations. Therefore, accurately predicting ciguatera outbreaks has become a priority, particularly in Rarotonga in the southern Cook Islands, which has reported the highest incidence of ciguatera poisoning globally, ranging from 204 to 1,058 per 10,000 population from 1994 to 2010. Here we tested two competing hypotheses that outline the primary causes of ciguatera outbreaks: (1) the 'new surface hypothesis' and (2) the 'climate oscillation hypothesis'. This study showed that the two supposedly mutually exclusive hypotheses are in fact linked. We found strong correlations between cases of ciguatera poisoning and (i) the positive phase of the Pacific Decadal Oscillation, (ii) El Niño years, and (iii) periods with frequent disturbances. Yet, most disturbances occurred during the abovementioned climate phases. Since 2006, the number of cyclones has decreased considerably in Rarotonga, because of the climatic shift toward the negative phase of the Pacific Decadal Oscillation, and as predicted by the 'climate oscillation hypothesis', Rarotonga is reporting fewer cases of ciguatera poisoning.Because there is a lag period between a cyclone event and ciguatera poisoning appearing in the human population, the findings of this research arecritical as part of an early warning system for Rarotonga and potentially other Pacific nations experiencing similar problems.

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