Hazard Modeling for Hurricane Early Warning System

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Introduction

Developing timely and effective warning mechanisms that will trigger life and property saving procedures before a disaster strikes a community, is paramount to effective disaster prevention and mitigation. The improved access of people to early warning systems for natural hazards at all levels is one of the three programme targets of the International Decade for Natural Disaster Reduction (IDNDR).

In the Caribbean hurricanes and tropical storms are annual occurrences. Although little can be done to change the character or frequency of these events, the damage and loss of life that they cause can be significantly reduced through changes in the location and the quality of design of construction, and through appropriate contingency planning for emergency events. Damaging winds, coastal storm surges, heavy rains and waves can each inflict severe damage during a storm, affecting different locations or combining to significantly increase damages in a highly vulnerable site. Prior hazard awareness and risk assessment practices must be employed well before any immediate threat in order to reduce the impacts of these hazards.

With appropriate information on storm surge and wind hazard risks in the Caribbean region, emergency managers, development planners and meteorologists can better prepare for and respond to destructive storms. Appropriate and cost-effective vulnerability reduction measures - such as building setbacks, higher building standards and construction of protective structures - can be better identified and implemented using accurate information on hurricane hazard risks. To this end, USAID/OAS Caribbean Disaster Mitigation Project (CDMP) has supported the development of a storm hazard model, developed by Charles Watson and called The Arbiter Of Storms (TAOS), for assessing the impact of storm surge and wave action on coastal areas throughout the region. Such information can be used for emergency evacuation and coastal land use planning, as well as the design of standards for infrastructure. Information of this sort is vital for a proper warning system and for the reduction of the impact of the hazards caused by these tropical cyclones.

Description of the TAOS Model

TAOS is a computer based numerical model that produces estimates of maximum sustained winds at the surface, and still water surge heights and wave heights at the coastline. Model runs can be made for any historical storm, for probable maximum events associated with