

Coastal Processes and Geomorphologic Characteristics of Major Coastal Towns in East Sabah for Assessment of Tsunami Impacts

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Synopsis

The major coastal town of East Sabah, comprising of Sandakan, Lahad Datu, Semporna and Tawau are characterized by extensive mangrove swamps, narrow sandy beaches and rocky coastlines. Most of the town areas are built on reclaimed mangrove swamps. The Sandakan and Tawau town areas are exposed to the open Sulu and Celebes seas, respectively, whereas the towns of Lahad Datu and Semporna are sheltered from the open sea by the Sakar and Bum-bum islands, respectively. Numerical tsunami modeling, using worse-case scenarios indicate that all towns are exposed to tsunami waves up to 2 meters within 1 hour time. On a regional scale, Tawau area is found to be exposed to highest risk of tsunami due to its narrow shelf, followed by Sandakan and Lahad Datu areas. On a local scale, areas found to be of highest risks are settlements located along the coast, especially water villages located in all the town areas. Based on tsunami risk maps prepared for each town, a general plan for tsunami hazard mitigation is proposed, which includes tsunami hazard emergency evacuation route maps for each town area.

Sinopsis

Bandar utama tepi pantai Sabah Timur yang terdiri dari Sandakan, Lahad Datu, Semporna dan Tawau dicirikan oleh kawasan payah bakau yang luas, pesisir pantai yang sempit dan pantai berbatu. Sebahagian besar kawasan bandar terletak diatas kawasan paya bakau yang telah ditimbus. Bandar Sandakan dan Tawau masing-masing terdedah kepada lautan terbuka Sulu dan Celebes, sementara bandar Lahad Datu dan Semporna masing-masing dilindungi dari lautan terbuka oleh kepulauan Sakar dan Bum-bum. Permodelan numerik tsunami, menggunakan kes scenario paling buruk, menunjukkan bahawa semua bandar terdedah kepada ombak tsunami setinggi 2 meter dalam jangkamasa 1 jam. Pada skala rantau, kawasan yang berisiko paling tinggi adalah Bandar Tawau, disebabkan pelantarnya yang agak sempit, diikuti oleh kawasan Sandakan dan Lahad Datu. Dalam skala tempatan, kawasan yang paling tinggi risiko adalah penempatan sepanjang tepi pantai, khususnya perkampungan air yang terdapat di semua bandar. Berdasarkan kepada peta risiko tsunami, pelan tindakan am untuk mengurangkan kesan tsunami diutarakan, yang merangkumi peta-peta laluan keluar kecemasan bencana tsunami bagi setiap kawasan bandar.