



## **Modeling of Shoreline Changes of Tulamben Coast, Bali Indonesia**

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### Modeling of Shoreline Changes of Tulamben Coast, Bali Indonesia

Tulamben coast is located in Lombok Strait on the northeastern coast of Bali island, Indonesia, as part of Karang Asem district. Severe erosion along the coastline has long been occurred in Karang Asem area and threatening houses, religious buildings (Hindu temples), and a national heritage site. As one of most popular diving site in Bali Island, Tulamben attracted many local and international tourist since 1980. The main attraction of Tulamben diving site is the USAT Liberty ship that was shipwrecked in Tulamben beach in 1942, after attacked by Japanese torpedo in Lombok Strait. Currently about 150 diver visit Tulamben per day. Due to physical changes of coastal environmental such as coastal erosion, sliding, and scouring, the shipwreck is vulnerable. It had been slipped off the beach several times and is predicted would be moved to deeper offshore floor if it is not protected. Coastal erosion in Karang Asem district is occurred probably due to interaction between cross-shore and long-shore wave-generated current and river sand supply decreasing after sand mining activities. In this study, the effect of cross-shore and longshore transport to coastal erosion in Tulamben is analyzed by doing numerical model.

Numerical simulation of shoreline changes is performed by using Beach Processes Module of CEDAS (Coastal Engineering Design and Analysis System) consists of SBEACH and GENESIS. The model domain is covered Karang Asem coastline about 60 km length and wave data is calculated from hourly wind data (10 years). Simulated shoreline is calibrated using shoreline data from 1972 to 2013. Using calibrated model, then the simulation is performed from 2003 - 2013. From the simulation it is determined that longshore current and longshore sediment contribute to coastal erosion in Tulamben. Based on model results, several alternatives of general layout and configuration of coastal protection structures is proposed. The most optimum coastal protection system is determined by simulating proposed alternative using GENESIS.