What caused the water level raise in the battle of Luermen bay in 1661? Tide, Storm surge, or Tsunami?

Tso-Ren Wu*, Han Wu, Shun-Kai Hu, Yu-Lin Tsai, Mei-hui Chuang
Graduate Institute of Hydrological and Oceanic Sciences,
National Central University

Abstract

In 1661, Chinese navy led by General Zheng Chenggong at the end of Ming Dynasty had a naval battle against the Netherlands. This battle was not only the first official sea warfare that China confronted the Western world, but also the only naval battle won by Chinese Navy so far. This case was significant because it altered the fate of Taiwan until today. Ace of the critical points that General Zheng won the battle was entering Lakjemuyse bay unexpected. Luermen bay was and is an extremely shallow bay with a 2.1m maximum water depth during the high tide, which was not possible for a fleet of 20,000 marines to cross. Hence, no defense was deployed from the Netherlands side. However, plenty of historical literatures mentioned a strange phenomenon that helped Chinese warships entered the Luermen bay, the rise of water level. In this study, we will discuss the possible causes that might rise the water level, e.g. Tsunami, storm surge, and high tide. We analyzed it based on the knowledge of hydrodynamics. We performed the newly developed Impact Intensify Analysis (IIA) for finding the potential tsunami sources, and the COMCOT tsunami model was adopted for the nonlinear scenario simulations, associated with the high resolution bathymetry data. Both earthquake and mudslide tsunamis were inspected. Other than that, we also collected the information of tide and weather for identifying the effects from high tide and storm surge. After the thorough study, a scenario that satisfies most of the descriptions in the historical literatures will be presented. The results will explain the cause of mysterious event that changed the destiny of Taiwan.

Key word: Tsunami, Storm Surge, Mudslide, 1661 Luermen naval battle, General Zheng Chenggong, IIA, rise of water level, COMCOT