



On the little-known tsunami associated with the strong earthquake of 26 November 1595 in Crete island, Hellenic Arc

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On 26 November 1595 (NS) the island of Crete was hit by a strong earthquake which is reported in several documentary sources reviewed in a recently published book about the earthquakes and tsunamis of the area of Crete, Hellenic Arc (Papadopoulos, 2011). The earthquake caused important damage in the west part of the island, particularly in Chania town and the nearby Kastelli, in the castle of Selino, today Palaeochora in SW Crete, and possibly in the town of Rethymno. Damage and two victims were reported from Heraklion (Chandakas), the capital city of Crete. We estimated maximum seismic intensity of VIII degree in Chania, earthquake magnitude of $M_s=6.1(\pm 2)$ and epicentral co-ordinates for a shallow earthquake at around 35.60N, 24.60E, that is offshore to the northeast of Chania. The earthquake triggered anomalous, tsunami-like disturbance in the sea which remained only little known and, therefore, the tsunami-like event was not included in tsunami catalogues so far. Recently, Ambraseys (2009) reported on the sea disturbance that associated the 1595 earthquake but his account is only brief and does not provide the original source of information. One of the most important and detailed descriptions of the earthquake and its associated phenomena was a letter of the Italian medical doctor, botanist and reliable writer Onorio Belli, dated 22 January 1596 and directed to Mr Alfonso Ragona at Vicenza (Biblioteca Ambrosiana di Milano, R. 122). Being resident at the town of Chania, O. Belli experienced the earthquake himself. As regards phenomena in the sea, after saying that before the shock "... the atmosphere was heavy and clear and the sea calm. ...", O. Belli goes on to say that during the earthquake "... the earth was shaking terribly; the sea was boiling; the houses were breaking. ...", and that "Three galleys and other boats and vessels being at the port [of Chania] nearly sunk. ... Even in the [Aegean] Archipelago very serious damage was caused. Particularly in Melos, some boats coming from Rhodes, more than 50 miles in the open sea were very close to sunk". Then he adds: "People narrate several things and miracles but the next is remarkable. A young man was out of the city [of Chania], in the beach. The water of the sea rose, reached the young man and scalded his feet like the boiling water. He suffered a lot but didn't die". From these descriptions it becomes clear that the anomalous sea was observed along the north shore of Crete but also offshore, which is in favour of the tsunami nature of the disturbance. Another testimony about that earthquake is contained in the manuscript of the divine service of evangelist Matthew, published by Kominis (1968). The manuscript, archived with no. 9 in the codex of Gennadeios Library of Athens, was written on 1612 by the priest Ioannis Morzinios who very possibly eyewitnessed the 1595 earthquake. Among others, the manuscript contains the divine service of the large earthquake that hit Constantinople on 26 October 740 as well as the divine service synthesized by I. Morzinios about the 26 November 1595 earthquake in Crete. In f. 22 of the manuscript, one of the hymns devoted to the 1595 earthquake says that because of the earthquake "... houses and churches were rupturing and foundations and mountains were staggering as well as the sea. ...", which is another evidence for the sea disturbance caused by the 1595 earthquake. From the descriptions of O. Belli we estimated tsunami intensity of IV-V degree in Chania port in the 12-grade Papadopoulos-Imamura (2001) tsunami intensity scale.