15th International Congress of the Geological Society of Greece
Athens, 22-24 May, 2019 | Harokopio University of Athens, Greece
Bulletin of the Geological Society of Greece, Sp. Pub. 7 Ext. Abs. GSG2019-140

The 21 July 2017, Kos-Bodrum tsunami intensity mapping: Applying the integrated Tsunami Intensity Scale (ITIS2012)

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Introduction

On July 21, 2017 (22:31 UTC), a Mw 6.6 earthquake occurred off-shore the Kos Island, Greece. The epicenter is located in the marine area between Kos Island and the Turkish coasts in Gokova Bay. Shortly after the earthquake, tsunami waves hit the south-east coast of Kos and the coast of Mugla province in the Gokova Bay area.

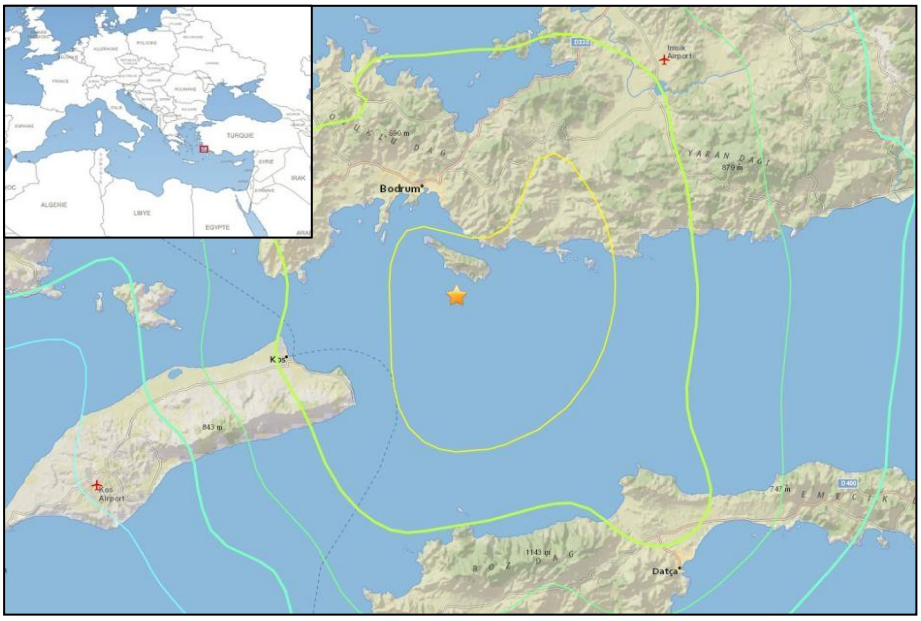

Figure 1. Interactive map for earthquake on July 21 (USGS map)

Methods

In order to assess the tsunami intensity, data regarding the tsunami impact and gathered from multiple sources on both the coastal zone of Kos and the eastern coast of Turkey, have been recorded, assigned against the ITIS2012, and mapped using ArcGIS. Interpolation methods have been used in order to display the impact zoning in the inundated areas.

Primarily collected data (autopsy, photo material, drone recordings, witnesses' testimonials) along with the web published data and preliminary scientific reports have been mapped and evaluated against ITIS2012.

Data collected from 48 different points around the tsunami affected area. Most of them are located in or closed to city of Kos (Greece) and city of Bodrum (Turkey).

Results

The results show limited, yet notable impact on each one of the ITIS2012 categories, escalating among the middle grades of the Scale, and classifying the event as a middle-intensity tsunami.

The max intensity for Bodrum area in Turkey is estimated at VII/XII grade as for the same tsunami the max intensity for Kos area in Greece is estimated at VI/XII grade. This can be attributed to different morphology, possible different distance, different wave direction or coastal land use.

Table 1. Tsunami intensity numbers based on IT IS_{2012} grade scale.l

$ITIS_{2012}$ Categories	Grade scale for Kos Port (GREECE)	Grade scale for Bodrum (TURKEY)
Physical Quantities	VI	VII
Impact on humans	V	V
Effects on mobile objects	VI	VII
Impact on infrastructure	VI	VII
Geoenvironmental Effects	V	VII
Effects on structured environment	VI	VII

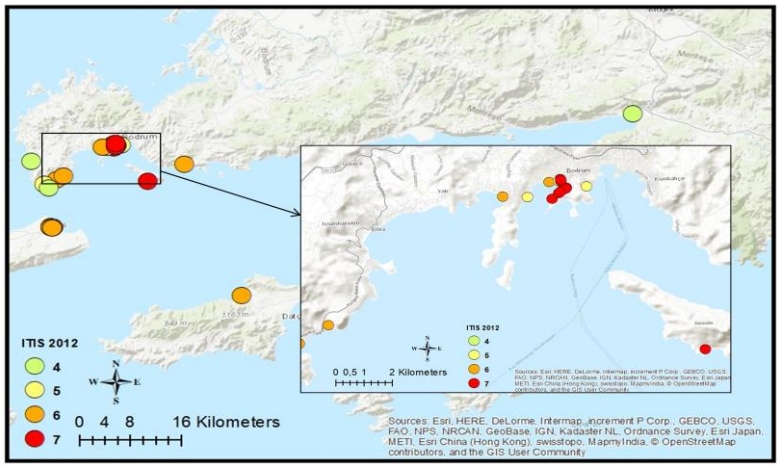

Figure 2. Kos-Bodrum tsunami intensity mapping.

Conclusions

Earthquake activity in Aegean Sea can easily generate tsunami waves and affect coastal humans and human activity.

Applying the ITIS Scale to a middle-intensity event for the first time, showed that the individual $ITIS_{2012}$ criteria successfully complemented each other creating an excellent zoned or point map.

The main criteria categories that mostly defined e a medium-impact tsunami are: a) Quantities, b) Impact on human & c) mobile objects

However needed direct field observation and direct data collect for better quality on every ITIS2012 category.

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