

Abstract title

STRATIGRAPHIC AND STRUCTURAL ANALYSIS OF A HIGH RESOLUTION SEISMIC SURVEY PERFORMED IN THE BAY OF AUGUSTA (SE SICILY)

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Abstract

The Bay of Augusta is located along the NE margin of the Hyblean Plateau (SE Sicily). In this area a mostly bioclastic and terrigenous Quaternary succession outcrops. This area recorded a constant regional uplift rate of <1 mm/yr during the Late Pleistocene and recurrent, strong (up to 7.0 Md) historical earthquakes. Data for this study come from a recent nearshore geophysical survey performed by URS Corporation Ltd with the aim to evaluate the potential for seismic hazard. The collected data consist of: 1) a high resolution seismic survey (sparker source and sub-bottom profiling); 2) five soil borings to characterize and obtain age dates for shallow subsea sediments.

Four main seismic units have been recognized inside the sedimentary infill:

- Unit D is the oldest, seawards dipping, unit overlying the acoustic basement. Upwards this unit is bounded by a rough, erosional truncation (horizon H4).
- Unit C shows sub-horizontal reflectors with variable seismic attributes, forming a prominent angular unconformity above H4; in the proximal sector of the Augusta Bay they lie seaward dipping. This unit shows valuable thickness change across the Bay and is bounded upwards by a very rough erosional truncation (horizon H3).
- Unit B shows planar parallel reflectors with good lateral continuity. Its thickness change and it is very thin along the slope of the morphostructural highs formed by uplift of units D and C. Upwards it is bounded by a very prominent erosional truncation (H2 horizon).
- Unit A is imaged by sub-horizontal, continuous reflectors, alternating with intervals of transparent seismic facies. The reflectors onlap the H2 horizon and, in a few places, display prograding geometry.

On the collected samples biochronological and radiometric age-dating has been performed. The cores drilled the unit A and the uppermost part of the unit B, where the sediments have revealed absolute age > 50 kA. Two main groups of faults, referred to as the northwest and the southwest fault zones, are separated by a central zone where no evident fault planes have been imaged by seismic data. The faults in both groups strike from N30W to N52W and are also inferred to be steeply dipping.

The faults pertaining to northwestern cluster show a very little offset, < 15 m. These faults have displaced mostly seismic unit C and have controlled two, NW-SE trending little structural lows in the central and in the northernmost sectors of the investigated area. These restricted basins have been filled by B and A seismic units deposits that don't appear displaced by the fault cluster.

The southeastern fault zone is long less than 700 m and show an offset of 1 to 5 m. These faults displaced the horizons of seismic Unit C in a sector where this unit outcrops at the sea bottom or it is draped by a very thin veneer of Unit A sediments.

The faults pertaining to the northwestern zone post-date Unit C but they appear older than Units B and A.

Radiocarbon age-dating have demonstrated that the most recent horizons involved in the northwestern fault zone displacement is > 50 kA.

As concern the southeastern fault zone, results coming from radiocarbon age dating don't have sufficient resolution to correlate deposits to seismic horizons involved in tectonic deformation. Nevertheless, there the seismic unit A also appears slightly involved by the latest faults activity.

The analysis of the Bay of Augusta seismic grid has shown that very recent tectonic features have displaced the Late Quaternary sedimentary infill; interpretation of our results could better constrain the neotectonic setting of an area characterized by high seismic hazard.

Presentation mode

POSTER

Choice of session

1st OPTION E3 - Integrated approaches of geophysical and engineering-geological investigations in defining the subsurface model

2nd OPTION D12 - Coastal environment: from disciplinary research to applications