



## **Aseismic blocks and destructive earthquakes in the Aegean**

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Aseismic areas are not identified only in vast, geologically stable regions, but also within regions of active, intense, distributed deformation such as the Aegean. In the latter, “aseismic blocks” about 200m wide were recognized in the 1990’s on the basis of the absence of instrumentally-derived earthquake foci, in contrast to surrounding areas. This pattern was supported by the available historical seismicity data, as well as by geologic evidence. Interestingly, GPS evidence indicates that such blocks are among the areas characterized by small deformation rates relatively to surrounding areas of higher deformation.

Still, the largest and most destructive earthquake of the 1990’s, the 1995 M6.6 earthquake occurred at the center of one of these “aseismic” zones at the northern part of Greece, found unprotected against seismic hazard. This case was indeed a repeat of the case of the tsunami-associated 1956 Amorgos Island M7.4 earthquake, the largest 20th century event in the Aegean back-arc region: the 1956 earthquake occurred at the center of a geologically distinct region (Cyclades Massif in Central Aegean), till then assumed aseismic.

Interestingly, after 1956, the overall idea of aseismic regions remained valid, though a “promontory” of earthquake prone-areas intruding into the aseismic central Aegean was assumed.

Exploitation of the archaeological excavation evidence and careful, combined analysis of historical and archaeological data and other palaeoseismic, mostly coastal data, indicated that destructive and major earthquakes have left their traces in previously assumed aseismic blocks. In the latter earthquakes typically occur with relatively low recurrence intervals, >200-300 years, much smaller than in adjacent active areas. Interestingly, areas assumed a-seismic in antiquity are among the most active in the last centuries, while areas hit by major earthquakes in the past are usually classified as areas of low seismic risk in official maps.

Some reasons for the apparent contrast between “aseismic” and seismic regions is the problem of the time scale in earthquake sampling, which is superimposed on the problem of earthquake memory within people, especially in changing cultures, and on the selective, “coded”, privileged, even extravagant presentation of certain earthquakes by historical sources, troubling ancient, sub-modern and modern investigators and hence distorting the pattern of earthquake occurrence.