

POCKMARKS AND GAS SEEPS AS EARLY-WARNING EARTHQUAKE PREDICTORS

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Submarine gas and liquid escape from the seabed has long been treated as mere curiosities. But after some thorough seafloor mapping work, starting with the advent of the side scan sonar, in the late 60's, it became clear that fluid flow from the seabed was much more common than previously suspected. The use of multibeam echosounders, from the mid 80's, have verified this notion. Seeps and their imprint on the seabed, pockmarks, occur in all types of marine and lacustrine submarine sediments (Hovland and Judd, 1988).

In addition to indicate 'hydraulically active' seabed locations, pockmarks are known to occur in areas with gas hydrates and in association with slides and slumps. But their potentially greatest future significance may be as early-warning indicators for earthquakes. This was clearly demonstrated, by chance, in the Gulf of Patras in 1993 where pockmark and seepage activity increased dramatically before a M5 event (Hasiotis et al., 1997). However, this was not the only recorded indication of increased seepage activity prior to earthquakes.

This paper reviews some of the historically recorded indications that pockmarks and underwater fluid seepage may be worth-while to monitor in earthquake prone areas. In order to verify the value of such early-warning, a few choice pockmarks need to be instrumented and monitored with temperature, pressure, and acoustical sensors over some years. This calls for a multinational program, which is actually under way by European scientists, thanks to the recordings in the Bay of Patras, 1993.

REFERENCES

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