



## **The Low-Velocity Layers, Thermal Water Sources, and Seismicity in the Elbasani Zone, Albania**

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**Abstract:** Low-velocity fault zones (LVFZs) have been detected by fault-zone trapped waves along the Elbasani-Dibra Fault. In this zone, hot mineral water (thermal waters) spot out from natural springs which have been known since the 19th century. We estimate the 3D seismic velocity structure in the Elbasani zone to understand the factors controlling the genesis of such earthquakes. A narrow low-velocity zone is imaged within the transversal fault zone over a length of ~50 km, which partly penetrates into the mantle. The low-velocity zone correlates in space with the NE-SW trending earthquake cluster. A reactivation of thermal water in this fracture zone is probably related to the low-velocity anomaly. Where geological conditions are favourable, rainwater seeps through the surface and becomes trapped in vast underground reservoirs so deep below the Earth's surface that it becomes heated to high temperatures by the LVFZ. Thermal waters flow out through the contact of conglomerate layer with calcolistolith. In this area too, the reservoir is represented by the Llixha limestone structure the typology of earthquakes in Elbasan-Dibra comprises all four main well-known types of earthquakes: the earthquakes with main-shock followed by aftershocks, the earthquakes with foreshocks, the compound earthquakes, and the swarms.

**Keywords:** *3D velocity structure, low-velocity, thermal water, seismicity, fault.*

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