



Seismicity, gas emissions and crustal creeping along the Main Marmara Fault: outcomes from near-fault, seafloor monitoring

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Since the devastating Izmit and Duzce earthquakes of 1999, the seismicity within the Sea of Marmara was extensively studied, to determine the mechanical behaviour (creeping vs locked) of the Main Marmara Fault (MMF) segments. So far, the micro-seismicity has been interpreted only in terms of tectonics, although the MMF is known to strike across gas-prone sediment layers. Our results show that shallow (<5 km), low magnitude, gas-related activity produce ill-resolved vertical swarms of seismicity, in absence of near-fault, seafloor, monitoring systems. These swarms tend to disappear on micro-seismicity maps of magnitude greater than 3. Most earthquakes above 3 occur along the western segments of the MMF, which supports (without demonstrating) the hypothesis of deep crustal creeping where most seafloor gas emissions are found, against locking along the eastern segments of the MMF. Based on these findings, a tentative proposal is presented to optimize the permanent seafloor monitoring of earthquake hazards related to the Main Marmara Fault system.