

RECENT SWARM ACTIVITY IN THE GULF OF AQABAH REGION

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ABSTRACT

During the last two decades, the Gulf of Aqabah has been considered one of the most active seismogenic zones in the Eastern Mediterranean region. Recent seismicity and swarm activity in the gulf have been examined in relation to the tectonics and structures indicated by surface geology, remote sensing and new analysis of aeromagnetic data.

On November 22, 1995, a swarm of earthquakes began in the central part of the Gulf of Aqabah at the Aragonese fault step zone (Lat. 28.8° N & Long. 34.7° E) with a maximum magnitude of $M_D \sim 5.8$ and followed by nearly eight thousands aftershocks ($1.5 < M_D < 5.8$) in the next 40 days. The majority of seismic activity of this swarm is clustered in the area located between 28.3° - 29.3° N. and 34.3° - 34.9° E. More than 150 events were reported in the four countries surrounding the gulf and ranged in magnitude of M_D between 3.7 and 5.8."The remaining uncertainties in epicenter locations in the shield and the low level of seismicity in the southern portion of the gulf might be due to lack of seismographic station coverage and to the presence of diapiric structure respectively.

The most remarkable aspect of the earthquake swarm sequences in the Gulf is the spatial distribution overlapping of 1995 swarm with earthquake sequences in 1983, 1991, and 1993 and the migration of the epicenters northeastward about 60 km in 40 days with focal depths less than 10 km confirming the continual motion along the Arabian plate boundary.

The preliminary results obtained from this study indicate that the seismic activity occurs in the form of mainshock-aftershock sequences and may be attribute to stresses resulting from subsurface magmatic activity. The recent swarm may release energy that can be accumulated to cause larger events in the future. Aeromagnetic anomaly patterns and earthquake locations provide evidence for continuation of the strike-slip faulting regime from the gulf northeastward into the land, east of the gulf, suggesting that the northern portion of the gulf is subjected to more severe seismic hazard compared to the southern portion.

KEYWORDS Gulf of Aqabah; earthquake swarm; tectonics; Arabian plate; mainshock-aftershock; seismicity; remote sensing.