

OMAN SEISMOLOGICAL NETWORK AND SEISMICITY

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Keywords: Earthquake, Oman Seismological Network, Makran Subduction Zone

ABSTRACT

Sultanate of Oman unique location on the southeast corner of the Arabian Plate makes it susceptible to felt earthquakes over the years. Information on earthquakes in the vicinity of Oman can be found in literature includes examples of devastating events such as the earthquake that damaged several villages in the vicinity of Muscat 1883, the earthquake that damaged Qalhat in northern Oman at the end of the fifteenth century, and earthquake events that occurred in the Musandam region (northernmost Oman) in 977 AD, 1184 AD, and 1483 AD. Those historical earthquakes and the surrounding active tectonics along the Makran subduction zone, the Gulf of Aden, and the Zagross collision zone; along with the fast development of Oman in the last few decades all necessitated the establishment of a local seismic network to monitor seismic activity in and around the Sultanate. In order to record earthquakes and mitigate earthquake hazard by a good manner, a multi-phase program was approved by the authority and followed by the earthquake Monitoring center (EMC) at Sultan Qaboos University (SQU).

Oman Seismological Network (OSN) consists of twenty broadband stations. The phase I of OSN consisted of ten three component short period sensors (SS-1) distributed at remote locations in north and south Oman regions. Those remote stations transmit recorded seismic data continuously via the VSAT satellite to the Earthquake Monitoring Center (EMC) at Sultan Qaboos University (SQU). The phase II of OSN consisted of three broadband seismograph stations. Two of these stations are located in northern Oman in Musandam and Alburaimi areas and the other one is located in Dhofar region; Southern Oman. In 2011, the OSN enhanced by the completion of installing phase III stations. This phase consists of seven broadband seismograph stations distributed to fill in the gap between separated stations and where more seismicity is expected. Thus, two of them located in the north, one in Al-Sharqiyah region, two in Al-Wusta and two in Dhofar region; Southern Oman. Recently, the short period stations have been upgraded to broadband. By conducting this phase the records of local seismicity increased especially in the north (Masafi-dibba) region as well as in the south. To sum up, this phase enhanced the network coverage and more small magnitude local seismicity starts show up. Current seismicity shows that the earthquakes are concentrated along the known tectonic sources.

INTRODUCTION

Oman is located in the southeastern part of the Arabian Peninsula. Tectonically, it is situated in the south eastern part of the Arabian plate. Arabia as a part of the megacontinent "Gondwana", was located south of the equator throughout the palaeozoic era. Initially, it was geometrically 'up-side-down' relative to the poles as "Gondwana" moved south across the South Pole (and came up the other side the 'right-way-up') under the influence of plate tectonic processes.