Studies of Tectonic Movements in Saudi Arabia Using CORS

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Key words: Cadastre; Deformation measurement; Engineering survey; GNSS/GPS; Positioning;

SUMMARY

Studies of Tectonic Movements in Saudi Arabia Using CORS Muhamad Al Rajhi and Ali Al Omar, Saudi Arabia Ramazan Yanar, Fahri Kartal and Kamil Eren, Turkey Key words: tectonic movements, deformation, earthquake, CORS, GNSS SUMMARY This paper presents the scientific applications of GNSS in general and CORS in particular. Amongst others, these applications include: monitoring plate tectonics, deformation meteorological studies using CORS data. The paper also discusses case studies of scientific applications such as the results of the velocity of Arabian plate. Earthquakes have been the great natural hazard that threatens the Middle East region socially and economically. Hence, it is crucial to have knowledge on the characteristics and dynamics of the tectonic fault lines to mitigate this hazard. This mission is partly accomplished by the outcomes of the CORS networks by looking at the results of CORS data process obtained from an 8 year measurement period in Saudi Arabia as presented in this paper. The precise positions of 13 x CORS sites in Saudi Arabia at epochs 2004.0 and 2012.7 were compared to determine the tectonic movement of the Arabian Plate. The results show a displacement of about 37.1 cm in NE direction corresponding to a velocity of about 4.3 cm / year in the same direction. The same data was also used to determine internal deformations in the Arabian Plate. In Saudi Arabia, there are already 186 CORS sites. By the end of 2014, the number or CORS sites shall reach about 300. These sites shall affectively serve for geodetic positioning and engineering surveys. They will also serve scientific applications such as tectonic movement of the Arabian Plate, crustal deformation studies and modeling of the atmosphere (troposphere and ionosphere) over Saudi Arabia. However, this network needs to be expanded to cover the Arabian and Eurasian plates so that these networks can greatly contribute to scientific studies related to geohazards and disaster management in the region.