NUMERICAL SIMULATION AND INUNDATION OF TSUNAMI WAVES IN MAKRAN ZONE USING COMMIT-MOST AND GEOWAVE MODELS

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In the northwest of the Indian Ocean, because of subduction Oman Oceanic plate below the Iran continental plate, Makran subduction zone has been made. Makran subduction zone has been expanded from Hormoz strait to boarders of India that its length is about 900 Km (Mokhtari et. al., 2006) in east-west direction. Studies show that minimum subduction velocity of Oman plate below the Iran plate is about 19.5 mm/year. The maximum amount of it has been estimated 27 mm/ year (Vernant et al., 2004). Iran and Pakistan's Makran is limited from the east by Erenchnal and Chaman faults and from west by Minab (Zendan) fault (Figure 1).

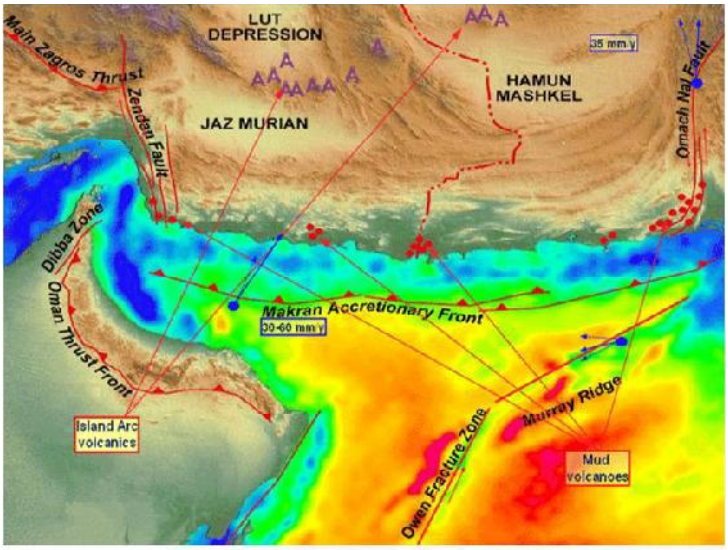

Figure 1. Makran subduction zone and its surrounded faults

For numerical modeling of tsunami waves in coastal water or deep water, propagation and inundation in the region, is a useful instrument for investigation. In this study, we use MOST (Method Of Splitting Tsunami) prepared by Titov from PMEL and Synolakis from south California university with graphical interview COMMIT (COMM on Interview of Tsunami) (Synolakis et al., 2008) for producing, wave propagation into the affected area and inundation in length of the study area and also GEOWAVE model. For re-producing the right wave dynamics during calculating inundation, high resolution bathymetry and topography grids are needed. In this study, position of earthquake was selected in Makran subduction zone.

Numerical model MOST prepared by NOAA/PMELL for implementing non-linear shallow water oceanic model. Wave propagation with numerical scheme of dispersion has been used. The equations of wave propagation in shallow water are (Titov et al., 1997):

$$h_t + (uh)_x + (vh)_y = 0$$

$$u_t + uu_x + vu_y + gh_x = gd_x \qquad d(x,y,z) = d_0(x,y,t),\ t \le t_0$$

$$v_t + uv_x + vv_y + gh_y = gd_y \qquad d(x,y,t) = d_0(x,y,t_0),\ t \le t_0$$

That $h - \eta(x,y,t) + d(x,y,t)$ is wave amplitude, $d(x,y,t)$ non-turbulent water depth, $u(x,y,t)$, $v(s,y,t)$ depth-averaged velocities in X and Y direction, and "g" is gravity acceleration. Maximum inundation for 9 richter earthquake has been simulated by MOST model shown in Figure 2

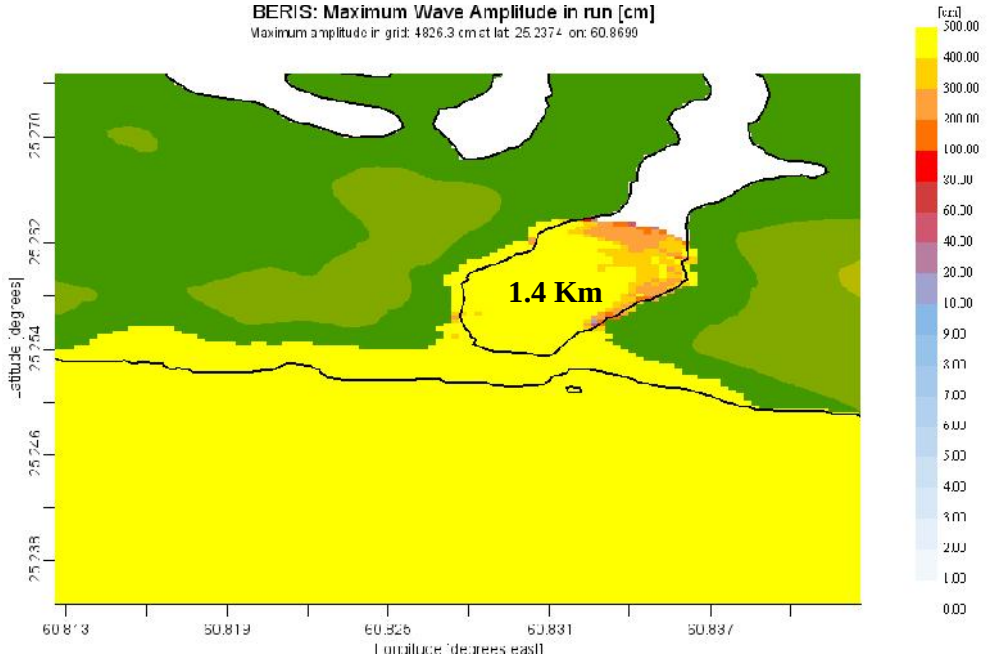

Figure 2. maximum inundation for 9 richter earthquake

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