Strong motion directions from collapsed buildings and rockfalls in coastal Syria

M. Kázmér[1] & B. Major[2]

(1) Department of Palaeontology, Eötvös University, Pázmány Péter sétány ¼, H-1117 Budapest, Hungary, E-mail: mkazmer@gmail.com
(2) Department of Arabic and Islamic Studies, Péter Pázmány Catholic University, Egyetem utca 1, H-2087 Piliscsaba, Hungary. E-mail: balazs.major.hu@gmail.com

Archaeoseismological and geological field surveys have been carried out in coastal Syria in 2008-2010 to document evidence for the rich earthquake heritage of the region. Safita, a crusader fortification in Tartous governorate in coastal Syria, have been damaged in the 1202 AD earthquake. The tower suffered heavy vibration which widened the central portion of the first floor and second floor walls by 20-30 cm each direction. Damaged arches with fallen keystones are conspicuous on the first floor. Apparently an ~E-W strong motion was responsible for the damages.

Farther to the north, in Khirbat al-Khurshiya, an abandoned, small Byzantine town, a rich variety of damages were observed. Shifted, fallen, and rotated blocks along the quarry walls display displacement uniformly in northward direction, suggesting a north-south strong motion. Hewn stones are displaced up to several metres in a similar direction. Rillenkarren developed on blocks after rotation suggest that the earthquake occurred several hundred years ago. Two fallen columns in the city corroborate N-S shaking.

Furthermore, various rockfall sites, where house-sized blocks slid and rolled downslope, have been surveyed in Jebel Ansariyya. A preliminary assessment indicates that most collapses occurred in N-S direction.

Remarkably, the 1202 AD earthquake caused ~E-W damages in the donjon of al-Marqab citadel near Baniyas, while a major, post-1202 earthquake damage records an approx. N-S shaking (Kázmér & Major, 2010).