GRAVIMETRIC MODELING OF BASIN AND RELATION WITH EARTHQUAKE DAMAGES

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ABSTRACT.- After the 17 August 1999 earthquake, as the regional distribution of the damaged buildinas at Gölcük-İzmit and surroundings are examined, it can be observed that some of the buildings in some regions that have the same quality and type with other buildings in other areas have more damage. This work attempts to point out that the concerned situation is closely related with the alluvium and basement topography over lined by the deposit layer as well as the rigidity of the soil. After 17 August 1999 earthquake, considering the allocation of heavy damaged buildings in the study area it can be seen that, they are close to the half basins whose southern sides are open or buried valley walls. This direction is in the way of the Earthquake waves. This situation clearlv demonstrates the focusing effects of the earthquake waves. In order to show the focusing effect of the earthquake waves, 785 gravity data in 4 km2 area are measured in the settlement of İzmit municipality and. their modelling with inverse solution techniques were done to obtain the shape of the basement topoaraphy which is covered with alluvium. The location of the collapsed, heavy and intermediate damaged buildings was plotted on the calculated basement map and accordingly basin depth and damage distribution were observed as correlated. This relation will be preliminary information for the locations where the damage would be more concentrated in probable further earthquakes. The basement rock shows a deepening attitude towards the southern part of the study area. Basement topography is clearly formed by the buried sequential valley-hillside structures and slope of buried basin is close to right angle over some places. It is interesting that the damage density on the high stored buildings increases on the alluvial areas that are over the buried valley shape basement topography. The vertical or sub vertical hillsides of the basement topography covered by alluvium can be considered as buried fault planes. The surface topography that is seen as valley-hillside in the northern of the study area shows continuity to the west with the alluvial cover in southern of the study area needs to be taken into consideration of the oblique faulting.