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Network location free of a travel time model

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A new bulletin based procedure is developed for absolute location of single events, which generally doesn't require any velocity or travel time model or preliminary ground truth information. Location is based on travel time differences (TTD), calculated for the pairs of stations under assumption of constant apparent velocity between them. This assumption can be considered usually valid for the pairs of stations belonging compact dense sub-networks, small arrays and almost equidistant teleseismic arrivals. Solution is obtained via grid-search in the parameter space of epicenter coordinates and apparent velocity by comparison of the observed arrival time differences and calculated TTD using exponential bell-shape measure of coincidence. The method was verified and showed high efficiency using bulletin first arrivals data for a set of accurately located events.