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Interactive comment on "Characterization of a complex near-surface structure using well logging and passive seismic measurements" *by* Beatriz Benjumea et al.

Anonymous Referee #2

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General remarks on the paper titled "Characterization of a complex near-surface structure using well logging and passive seismic measurements" by Beatriz Benjumea, Albert Macau, Anna Gabàs, Sara Figueras-SE-2016-19.

Authors proposed a method that is used geophysical well logging and passive seismic measurements to characterize the near surface geology of the area located in Hontomin, Burgos (Spain).

They used sonic and gamma ray logs at two boreholes and 224 H/V stations and 3 arrays of passive seismic measurements:

The authors obtained and declared that passive seismic measurements provide a map

of sediment thickness with maximum of around 40 m and shear-wave velocity profiles from the array technique.

Passive seismic methods are very useful technique, especially if there are deep sediments and need to be higher depth resolutions. In normal case, active seismic measurements and techniques such as MASW is enough to obtain 30-40 meter penetration depths for geotechnical studies. The resolution and penetration depths also depend on the source which is used in the measurements in the field. In this study, authors applied the passive seismic techniques and also used well log data. But there are some important points that they have to be care to obtain more accurate results. It is also very important what kind of initial data and technique is used in the study. These parameters affect the final results directly.

In the study, when we analysis the figure 12, it is clearly seen in the first 50m and 100 meters, there are very big differences in the P and especially S wave velocity distributions. It means that obtained results are more accurate and trustable in deeper parts but not successfully obtained in near surface approximation. There are 300-500 m/sn velocity gap among the near surface calculations. Therefore authors must discuss why they can not obtain accurate results in the near surface depths?

I advise them to re-analysis the used methods or check the initial parameters used in the study. The obtained results also affect the obtained sediment thickness maps?

I should do advise them to read the following studies which are very close to the current study and it can increase the quality of the paper and enrich the study for the readers.

Kanli A.I., Kang T., Pinar A., Tildy P., Pronay Z., 2008, A Systematic Geophysical Approach For Site Response of The Dinar Region, Southwestern Turkey", JOURNAL OF EARTHQUAKE NGINEERING, vol.12, pp.165-174.

Singh S., Kanli A.I., 2016, Estimating shear wave velocities in oil fields: a neural network approach, GEOSCIENCES JOURNAL, vol.20, pp.221-228.

Kanli A.I., 2009, Initial Velocity Model Construction of Seismic Tomography In Near-Surface Applications, JOURNAL OF APPLIED GEOPHYSICS, vol.67, pp.52-62.

Kanli A.I., 2011, Integrated Approach for Surface Wave Analysis from Near-Surface to Bedrock, in: Advances in Near-Surface Seismology and Ground-Penetrating Radar, R.D. Miller, J.D. Bradford and K. Holliger, Eds., Society of Exploration Geophysics, Tulsa, pp.461-475.

Kanli A.I., Tildy P., Pronay Z., Pinar A., Hermann L., , 2006, V-S(30) Mapping And Soil Classification For Seismic Site Effect Evaluation In Dinar Region, Sw Turkey, GEO-PHYSICAL JOURNAL INTERNATIONAL, vol.165, pp.223-235.

C3