Dear Anonymous Referee #2,

Thank you for reviewing our paper and for your positive and useful comments. Please find enclosed the answers to your comments on behalf of all the co-authors and myself.

Kind regards,

Juan Alcalde

-Referee's comments are italicized, bold and addressed; manuscript text follows with changes tracked; new text added to the manuscript is attached in red for the discussion-

1) Numerous structures in the study area and their link to tectonics are mentioned. To what extent are these structures (still) assumed to be active, and what are their implications in relation to future CO2 storage?

The tectonic stability of the site is one of the pre-requisites for the selection of the site for the Pilot Plant according to the standard selection criteria for this kind of CO2 storage project (e.g., Bachu, 2000; Pérez-Estaún et al., 2009). Although the Hontomín site has undergone a number of tectonic events during the Mesozoic and Cenozoic, it is believed to be tectonically stable at present time. Ugalde et al. (2013) confirmed this interpretation by searching through the Spanish National Geographic Institute (http://www.ign.es) seismic catalogs up to September 2012. They report in their article that "less than 10 earthquakes with magnitude 2.5 or greater have been recorded within a radius of 50 km from Hontomín over the last 100 years, the largest being a 4.3 magnitude event that occurred in 1939 at a distance of about 40 km from the site". This is consistent with the Hontomín area being a low seismicity area. This information was added to the text as follows:

> The existing data indicate that the reservoir and seal formations are Jurassic in age, and form a slightly elongated dome-like structure with an overall aerial extent of 5x3 km^2. The area features low natural seismicity as stated in Ugalde et al., (2013).

The discussion of the implications of Geological Storage of CO2 in a seismically active area is out of the scope of this article.

2) CO2 storage is mentioned both in the abstract and the conclusion part of the paper, but the CO2 storage potential of the rocks are in fact only briefly discussed in the body of the

paper. The authors calculate a maximum storage capacity of the structure, but how do the authors expect the CO2 to react with the surrounding rock? Will the CO2 have the potential to e.g. dissolve the rock, and what are the potential implications?

Since this manuscript aims to provide a seismic image of the subsurface of the Hontomín site, it is not our purpose to discuss the effects of the CO2 injection in a carbonate reservoir. Several authors deal with this issue and there are a number of examples of this topic in the literature (e.g., Czernichowski-Lauriol et al., 2006; Izgec et al., 2008; Gaus, 2010; Liu et al., 2012; amongst others). In the Hontomín project, García-Ríos et al. (2013) are conducting the laboratory experiments aimed to describe the interaction of the CO2 with the caprock. A reference to their work has been added to the manuscript as follows:

> In spite of this lack of internal definition, we have calculated a theoretical CO_2 capacity of the reservoir unit within the Jurassic structure. We do not take into account the possible interactions of the CO2 with the reservoir formation since this is outside of the scope of this article. Further information about geochemical and rock physics interactions, conducted inside the Hontomín project, can be found in García-Ríos et al. (2013) and Canal et al. (2012), respectively.

Canal, J., Falcón, I., Barrientos, V., Juncosa, R., and Delgado, J., (2012). Injection of reactive fluids in geological reservoirs: The coupling between rock reactivity, hydrodynamics and petrophysics. DHI/Fluid Consortium Meeting Fall 2012. Colorado School of Mines. Abstract paper.

García-Ríos, M., Luquot, L., Soler, J. M., and Cama, J., (2013). Laboratory-scale interaction between CO2-rich brine and reservoir rocks (limestone and sandstone). Procedia Earth and Planetary Science, Volume 7, 2013, Pages 109-112

3) It is mentioned on page 1582 that based on an internal report and the paper of Ogaya et al. (2013) "...dipping events steeper than 16 degrees are rather unexpected, and therefore, quasi-horizontal dips were assumed in the processing." To me that is a bit surprising given the structural complexity in the area in general. Moreover, what are the risk and potential implications of having overlooked steeply-dipping events?

The Hontomín area has undergone different periods of sedimentation and a number of tectonic events have configured its current state. The study area has experienced different sedimentary environments and deformation episodes through its evolution (e.g. García-Mondéjar, 1996; Pujalte et al. 2004; Tavani et al., 2011; Quintà and Tavani 2012; Tavani, 2012; Tavani et al., 2013).

The stratigraphic formations deposited in the study area have, thus, been affected by a wide range of stress regimes. However, the resultant deformation is relatively low intensity because, among other reasons, the Hontomín area is away from the main deformation. Ogaya et al. (2013) does not find steep dips. These are only found locally in the surface of the study area in

a small scale structure above the Southern fault. Besides, the wavelength of this structure is almost sub-seismic. These dips, in any case, are not considered important enough to modify the data processing.

4) On page 1591, I would have given rounded numbers for the estimated lateral resolution. The values given here indicate (unrealistic) high precision of these estimates.

We totally agree with Referee #2 and we have rounded up the numbers of the capacity estimation following his suggestion.

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