

# ***Interactive comment on “Microbial community changes induced by Managed Aquifer Recharge activities: Linking hydrogeological and biological processes” by Carme Barba et al.***

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We want to acknowledge Anonymous Referee 2 for his/her evaluation of the present work. Regarding the comments of the Referee, we would like to clarify some aspects that maybe are not fully-developed in the manuscript.

Referee comment 1: Does the types of water change with wet/dry scenarios (eg., Type 1 water)? This seems possible.

We expect that background conditions (represented by Type I water) may not affect too much the microbial composition in comparison with the conditions induced by recharge

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process. One of the evidences that supports this approach is the fact that diversity indices (mainly Shannon and Evenness) remains constant in Type I waters, and decrease accordingly to the influence of the recharge process in wet scenario. Under this assumption, we divide the samples according to the influence that they receive from the recharge process. For doing this, we relied on the information provided by temperature and conductivity profiles (Figures 2 and 3) and the knowledge provided by other studies performed in the same study zone (Valhondo et al., 2014, 2018).

Referee comment 2: I believe the results of microbial communities in groundwater (Results section 3.1) should also be discussed in the Discussion section. Some of the results are lack of deep interpretation or further discussions.

In our opinion, the fitting of our results in the Intermediate Disturbance Hypothesis is wide-argued in the discussion section. Furthermore, we discuss the potential role of some microbial phylotypes related to aerobic oxidation, dehalogenation and denitrification processes. Likewise, we relate such presence with the influence received of recharge process. However, it is true that the lack of information about the contaminants presents in the system do not allow us to conclude the empirical relationship between pollutant concentrations and the presence of these phylotypes. In this way, we propose to include paragraph explaining this lack of evidence in order to propose future research work.

Referee comment 3: Can results and conclusions of this research be extended to other areas?

Yes, some of them can. Of course, we present results from a field experiment, that intrinsically is not performed in controlled conditions. We think that field studies are indeed realistic but their transferability becomes more difficult. However, here we present some interpretations of our study that could be transferred to other sites/experiments: a) The diversity indices can be perfectly compared between sites, whatever it were the approach (laboratory, pilot or field studies). The methodology that we followed for the

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calculation of such indexes is well-reported and widely applied. b) The Intermediate Disturbance Hypothesis can be also transferred. In fact, this study evidences that this ecological hypothesis has been accomplished in the Llobregat MAR site. Why could not this approach be applied or accomplished to other impacted environments? c) We present here the results of sequencing tasks that associate some microbial species with certain environmental conditions. We want that our findings would be useful for future research in groundwater microbiology, especially in impacted zones as Llobregat River Basin. Overall, we expect our study it could be transferable to groundwater-surface interaction zones with low nutrient concentration but high amount of micropollutants, emergent organic compounds, etc (as in the case of Llobregat River or other Mediterranean high impacted rivers).

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