Interactive comment on "Numerical modelling of flow and transport in Bari industrial area by means of rough walled parallel plate and random walk models" *by* Claudia Cherubini et al.

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The introduction has been significantly reduced, and a part has been added where the novel approach introduced by the manuscript has been added at the end of the introduction. The importance of the lower Pleistocene, syn-/anticline axis and geophysical properties has been added in the text: "The degree of fracturing degree affecting of the Calcare di Bari formation is quite variable and mainly depends mainly on the geological and structural (faults, anticline axis,...) evolution of the area including faulting and folding. Also the distribution of the local measurement of the Rock Quality Designation (RQD) index is confirmed by the variability of the electrical resistivity along geoelectri-

cal profiles (with length from 500 to 1000 m) and from the propagations of the P and S waves (seismic measurements; length of about 1000 m)." As far as the variability of the hydraulic conductivities, several studies indicate that in some carbonate aquifers where karstic phenomena are present, the hydraulic conductivity (k) is scale dependent (Galvão et al., 2016; Király, 1975; Sauter, 1991; Halihan et al., 2000). In particular, the hydraulic conductivity at the small scale (10-2-1 m) shows values of 10-8-10-5 m/s, due to the presence of microfissures and the matrix effect, while at a larger scale (1-100 m) typical values range from 10-7 to 10-3 m/s as a consequence of the macrofissures effect. At an even larger scale (i.e. regional, 100-104 m) k slightly increases to 10-5-10-2 m/s because of both fracture and karstic effects. These variations are mainly a consequence of the regional distribution and size of brittle deformation structures, like faults and joints, and localized karstic phenomena affecting the aquifer. Galvão P., Halihan T., Hirata R. (2016): The karst permeability scale effect of Sete Lagoas, MG, Brazil. Journal of Hydrology 532, 149–162. Király L. (1975): Rapport sur l'état actuel des connaissances dans le domaine des caractères physique des roches karstique. In: Burger, A., Dubertet, L. (Eds.), Hydrogeology of Karstic Terrains. International Association of Hydrogeologists, Paris, pp. 53–67, Series B, No. 3. Sauter M. (1991): Assessment of hydraulic conductivity in a karst aquifer at local and at regional scale. In: Proc. Third Conference on Hydrogeology, Ecology, Monitoring and Management of Ground Water in Karst Terranes, December 1991, Nashville. Halihan T., Sharp J.M.Jr., Mace R.E. (2000): Flow in the San Antonio segment of the Edwards Aquifer: matrix, fractures, or conduits? In: Wicks, C.M., Sasowsky, I.D. (Eds.), Groundwater Flow and Contaminant Transport in Carbonate Aquifers. Balkema, Rotterdam, The Netherlands, 129–146. Fig. 6 the caption has been modified by adding PCE. Fig. 9 has been modified in order to improve the visibility of the piezometric head contour line. Fig. 11 has been changed In order to improve the visibility by showing only the percentage of error for nf equal to 4 and 28 respectively. Fig. 12 the visibility of simulated plume has been improved and so the qualitative comparison between the observed and simulated values becomes more straightforward. The paragraph "Discussion and

results" has been added including the following sub paragraph: "flow modeling", "detection of the sources of contamination". Some more paragraphs have been added to discuss the results. L(ine) 25 the modification has been done. L72ff One sentence paragraphs have been put together. L199 'Also' has been removed as requested (so the sentence is 'consider pulse-like'). L228 the typesetting error has been corrected. L232 'not interested by tectonical discontinuities' has been substituted with 'does not show tectonical discontinuities'. L260 the answer to this point has been added in the text: "As regards the structural features of these deposits it is possible to observe that the anticline affecting the Cretaceous succession of the Calcare di Bari formation with an ENE-WSW axial direction (Fig. 1) causes a partial diversion of the water courses, whose path seems to be also influenced by some NE-SW fault (NE of Modugno). The former phenomenon is due to the antithetically dipping flanks of the gentle fold, while the latter effect is likely a consequence of the denser fracturing along the shear zone and hence the increased erodibility of the local outcropping limestone enhancing the water flow concentration. In general, the limestone bedrock hosts a wide and thick aquifer due to a diffuse rock fracturing and the karstic phenomena." L267 Average K values are from 10-3 to 10-4 as written in the text: "The average hydraulic conductivity of this aquifer is generally estimated in $10-3$ to $10-4$ m/s." L268 Under low pressure has been changed with low gradient L271 'hydrographic network' has been substituted with "flow pattern of ephemeral and intermittent streams. " L300 Real has been changed with estimated L495 The number of equation has been added L540 the comment is right. The correction has been done. 'The presence of one hot spot has been detected, located upstream of the groundwater flow, coherently with the state of contamination detected downstream.'