Three-dimensional modeling needs to be corrected or removed before publication.

1. Something fundamentally wrong with your 3D simulation with CFX. It can be seen from your "Fig. 1. Streamwise vertical profile along the longitudinal axis of the mean channel" that your vertical velocity profiles are not logarithmic and they are decreasing (turning back) near the free surface. The modelled part of your river is almost straight and without any vegetation where you expect almost logarithmic velocity profiles (see simulated profiles in Anderson et al., 2014, Rameshwaran et al, 2011, Shen and Diplas 2010).

2. Application of Ansys (2010) method needs to be sorted. In Anderson et al. (2014), Ansys (2010) method was applied on irregular river bed geometry mesh. Your bed seems to be flat in the simulation (like smooth ks case of Anderson et al., 2014). Is the Ansys (2010) method applicable for your case?

Reply 1. : We apologize first for the bad representation we gave of the computed velocity vertical profile. CFX solves the velocity field in a fixed domain containing also a volume above the free surface, on the assumption of common velocity for both air and liquid phase in each shared geometrical point (Nichols and Hirt 1975, Hirt and Nichols 1981). The velocity profile of the liquid domain has to be cut, of course, at the level with zero relative pressure, as we did in the revised version of the paper (see Fig.1). Moreover, we improved the simulation by increasing the number of the prismatic layers close the bottom. In Fig 1, we can see the profiles plotted in the semi-logarithmic space, showing a linear trend in the transition layer between the bottom and the fully developed turbulent velocity. No change has been observed with the new simulation in the computed distribution of the vertically averaged velocities along the lateral direction.

Reply 2. : The Ansys CFX code has shown a large reliability in the solution of turbulence problems, also in the shallow water case. Moreover, the main focus of the paper is not about the optimal reconstruction of the 3D velocity field in the specific test case, but about the similarity of the results obtained in the estimation of the vertically averaged velocities by the new formulas with the same results obtained by a 3D code.

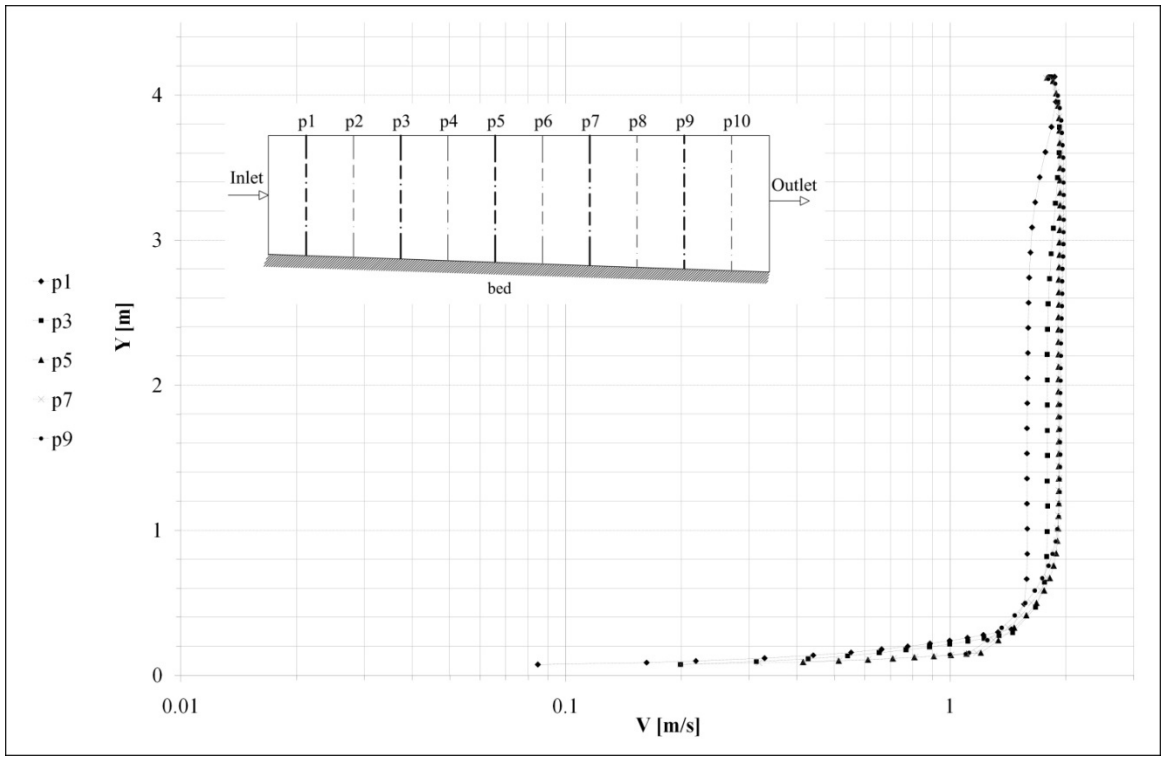

Fig. 1. Streamwise vertical profile along the longitudinal axis of the mean channel.