General Comments:

The manuscript evaluates the efficacy of the two available approaches of estimating the velocity distribution of a given discharge passing at the Paglia River reach flow sections in the vicinity of the Adunata bridge subject to the conditions of with and without the impact of the presence of bridge piers on the velocity distributions of the flow estimated at these sections using the entropy theory. These velocity distributions are compared with that of the velocity distributions of the same discharge obtained at these respective flow sections based on the flow fields simulated by a Computational Fluid Dynamics (CFD) model, considered as the benchmark model. The CFD model is set up using different types of observed input data measured and collected based on the recorded water level, velocity measurements made using current meter, rating curves and free surface velocity data collected using the water level and velocity radar sensors mounted on the downstream of the Adunata bridge deck for the three considered past flow events of 2012, 2019 and 2022. Further, the velocity distributions estimated at the studied river flow sections based on the application of entropy theory were assessed using the ADCP measurements made at the section far away upstream of the Adunata bridge. To simulate the velocity distributions at the studied river sections using the entropy theory, the authors have adopted two approaches of using the surface velocities estimated by the CFD model simulations at the considered sections of the considered flow event, *viz*., the use of span-wise simulated surface velocity estimates at the considered river section, and use of only the simulated maximum surface velocity estimate at the same section. Based on the study, the authors arrive at the conclusion that the span-wise estimated surface velocity measurements are needed to effectively capture the sectional velocity distributions close to that simulated by the CFD model at the sections immediately downstream of the bridge where the flow fields are impacted by the disturbance generated by the presence of bridge piers; whereas, the flow sections at far away upstream and downstream of the bridge, where the flow fields of the passing discharge are not impacted by the bridge piers, the velocity distributions estimated at these section using the entropy theory based only on the use of maximum surface velocity information may be sufficient for closely reproducing the CFD model based velocity distributions at these sections.

The study is timely and a needed one to widen the knowledge on the field applicability of the entropy theory for discharge estimation. It can be inferred from the study that when the flow field in a river reach is not impacted by the presence of a structure constructed across a river, then the measurement of maximum surface velocity may be sufficient to estimate the discharge passing at that section using the entropy theory. However, when the river section flow characteristics are impacted by the presence of a structure constructed across the river, then span-wise surface velocity measurements may be required to simulate the actual velocity distribution that prevails at that section which is required for serving the purpose of studying scour around the bridge piers. Therefore, both these different approaches of estimating surface velocity measurements using velocity radar(s) have their relevance to serve their intended practical purposes. The manuscript deserves to be accepted for the stated reasons. However, the authors need to address many comments and incorporate corrections in the manuscript, as given in the following pages, before its publication in the final form.

Specific Comments:

Comment-1: Since the manuscript describes the study carried out by the authors and then reported here, it would be appropriate to describe the study in the past tense rather than in the present tense, throughout the manuscript.

Comment-2: Since the main emphasis of the study is related to the velocity distributions of a given discharge passing through many flow sections of the river reach in the vicinity of a bridge,

the title of the manuscript may reflect on this aspect, specifically changed as

"Estimating the velocity distribution and the discharge passing at different flow sections of a river reach in the vicinity of a bridge using the entropy theory: Insights from the flow fields generated by a computational Fluid Dynamics model."

Comment 3: in Line #38, Explain, what is the secondary current of the second kind?

Comment 4: in Line #65, use of some field data! Which field data?

Comment 5: in Line #76, What do you mean by "weak gauging sites?" or is it wake affected gauging sites?

Comment 6: in Line #89, two European rivers! Specify these two rivers.

Comment 7: in Lines #106-107, severe flooding and high sediment transport! What is the impact of the high sediment rate transport on the flow velocity and its distribution under different magnitudes of sediment laden flood discharge?

Comment 8: in Line #117, "mayo axis", is it major axis?

Comment 9: in Line #167, it is stated that there different steady flow conditions are simulated using the 3D-CFD model which correspond to the peak flow conditions of flood events occurred in 2012, 2019 and 2022. But in Line #173, it is stated that surface velocity data are not available for the 2012 flood event. So how the 2012 flow event's velocity distribution was simulated using the CFD model for the peak discharge of the 2012 flow event?

Comment 10: in Line #185, define phi(M)!

Comment 11: in Line #208, Phi(M) is defined as entropy parameter, and in Line# 74, the parameter M is also defined as entropy parameter. So a consistent definitions of these parameters need to be given.

Comment 12: in Table-2 contents, the second line inside the Table the estimate of M is given as -1.03, what is the physical meaning of a negative M?