**Author’s Replies to the Comments of Reviewer #2**

***Comment 1:***

The authors investigate on the noise field radiated from a turbulent flow around a circular cylinder for different values of salinity and temperature. The numerical approach consists of coupling a RANS simulation with the FW-H acoustic integral equation. The subject is of great interest, in principle because the propagation of noise in underwater environment has different aspects which still need to be clarified and modeled to reproduce realistic numerical experiments.

In this study the sound spectrum level at two different measurement locations is computed for three values of temperature and two values of salinity. Also, the overall sound pressure levels (OASPL) related to the measurements before mentioned are reported.

***Reply 1:***

Thank you very much for the valuable comments of Reviewer 2.

***Comment 2:***

To the reviewer’s opinion, the manuscript would need a minor revision concerning a general improvement of the exposition of the methodologies adopted. In particular, the following sentence is fundamental since concerns the main contribution of the work:

“The acoustic calculations are performed for three temperature values (10o C, 20o C and 35o C) and two salinity values (20 g/kg and 35 g/kg) to investigate the effects of these parameters on the flow noise.”
I would ask to the authors to better explain how they accounted for the variation of temperature/salinity. Is the value of density in the FW-H equation changing from case to case? For each case, is the density constant in the field?

***Reply 2:***

The following sentences are added in Section 2.3.

“The acoustic calculations are performed for three temperature values (10 oC, 20 oC and 35 oC) and two salinity values (20 g/kg and 35 g/kg) for each temperature to investigate the effects of these parameters on the flow noise.”

“The physical properties of the fluid including density was changed by the fluid temperature.”

***Comment 3:***

Further, below is a short list of some unclear points:

- After equations (1-4) what is the meaning of “new variables […] are introduced” ?

- Some details on the equations: please, check the definition of Li ; the description of variables a0 and r (although they are well known as the speed of sound and the unit vector observer-source) is missing; the subscript “ret” is missing in eq. (4), does it means that volume integrals are computed without time delays. Also the authors must mention explicitly the methodology employed to calculate the quadrupole terms.

- The authors state that the hydrodynamic field is evaluated using RANS. How did they reconstruct the turbulent field in the wake, necessary for the computation of the quadrupole terms?

- Is there any reason for which the local Mach number appears on the surface integrals and is not considered for the quadrupole terms?

***Reply 3:***

Section 2.1 is modified accordingly.

***Comment 4:***

- In Figure 2, is the x-axis referring to non-dimensional frequency? Does it indicate Strouhal St = fD/U ? (being f frequency, D cylinder diameter and U uniform mean velocity)

***Reply 4:***

Figure 2 has been modified. Now, x-axis shows Strouhal number.

***Comment 5:***

- It may be due to small differences, but I would say that the spectrum in Figures 3,4 of microphone A2 look exactly the same.

***Reply 5:***

Yes, it’s true.

***Comment 6:***

- A general observation would regard the accuracy in capturing the main frequency of the flow-source. In fact, a reference value in literature for the Strouhal number is of about St = 0.2. Is it faced in previous work that the RANS approach may have some overestimation of the Strouhal number? It may be important, since the main frequency of a flow around a cylinder of diameter of 0.019 m, considering a St = 0.2 would be around 50 Hz, instead of 64 Hz.

***Reply 6:***

Yes, RANS approach have some overestimation of the Strouhal number in previous work as similar other studies which used RANS approach in literature. In future work, it is planned to use DES and LES approaches to obtain more accurate estimation of Strouhal number.

***Comment 7:***

- The authors use sentences from a previous paper as they are. They should be rephrased.

***Reply 7:***

They are changed.

***Comment 8:***

- Cianferra is mispelled in the references and in the text"

***Reply 8:***

*İt is corrected within the text and references.*