The manuscript "Inertia & viscosity dictate drop impact forces," by Sanjay and coauthors, reports experimental and numerical evidence of drop impact under a wide range of conditions, covering cases in which surface tension, viscosity, or inertia become dominant. Their main focus is understanding the laws that govern the primary and secondary peak of force signals, F_1 and F_2, and the times at which they occur, t_1 and t_2. The authors provide physical arguments that elucidate the data dependency on two dimensionless control parameters, tthe Weber (We) and the Ohnesorge (Oh) number, establishing general scaling laws. The physics of several limiting cases is also described in detail, fulfilling a broad picture of the studied quantities in the space of parameters.

This work addresses a profound and relevant question regarding drop impact, which has implications for many applications. To improve our understanding of the involved physical quantities, the authors perform and report several new experiments and simulations, extending the range of parameters of gathered data. Accordingly, the manuscript presents a regime map for the force peaks, constituting its main contribution. Thus, The goal is well-aimed, and evidence and theory support the results well. However, I still have some concerns that I include in the attached report, which the authors should address to assert and clarify several claims in the manuscript.

The manuscript is well-structured, easy to understand, and phrased in excellent English. Figures are not only helpful but also beautiful. The authors disclose every necessary detail to understand the experiments and numerical simulations and how they complement. Also, the literature on this problem cited in the manuscript is comprehensive.

In summary, this manuscript that studies the drop-impact force peaks dependency on Weber and Ohnesorge numbers provides new and relevant data and contributes with a necessary regime map on each of the quantities examined and in a broader range of the dimensionless number under study. I will be eager to recommend its publication in the Journal of Fluid Mechanics after the authors solve the points I raised in the attached report.

Comments to the Authors

This section includes scientific comments for the authors.

- Major comments & questions
  - Line 1: The title is misguiding. As far as I understand, both F_1 and F_2, and/or τ_1 and τ_2, depend under some regimes on surface tension γ, but the title excludes surface tension as a relevant parameter in drop impact forces. Authors could explain this better or choose a title that reflects all the quantities under study.
  - Figure 2: Although there are several pressure and velocity maps, etc., to characterize the different regimes throughout the article, there is only a single force signal (figure 2). Would the article benefit from including force signals for at least limiting cases of the dimensionless parameters? Force signal, the easier way to experimentally characterize the phenomenon, should provide a simple signature of the regime at which the drop impact occurs.
  - Line 111-114: Previous studies have considered much broader ranges of viscosities (c.f. Cheng 2022 and references therein) using other liquids and solutions. Readers could be addressed for completeness.
  - Figure 5: The authors of several other studies have found that F_1/F_ρ depends solely on the Reynolds number (Re), collapsing curves in an extensive range of high Re numbers. Have the authors tried to remove the dependency on γ (through Oh)? Since $Re \equiv \sqrt{We}/Oh$, I wonder if using it could collapse curves, at least in the low Oh limit.
  - Eq. 3.4: Following previous comments, results in the literature (e.g., Cheng 2022) include corrections as a function of Re in the low Re limit. Have the authors tried adding them to their expression to include both viscous and capillary contributions?
  - Eq. 3.7: I am still not convinced of the validity of averaging over t_{max} in Eq. 3.7. Many assumptions under consideration are valid only for the early impact and not through the spreading regime, which scales as t_{max}. In order to convince the readers, authors need to address this.
  - Figure 10: As a suggestion, I find that adding a Reynolds-number (tilted) axis, which nicely follows the slope of the central transition area of the white region of inset (a), will help readers to place previous experimental results in this regime map. It may be redundant, but still very helpful.