I have carefully examined the manuscript titled "More intense heatwaves under drier conditions: a compound event analysis in the Adige River basin (Eastern Italian Alps)" (egusphere-2025-1347-2), submitted by Marc Lemus-Canovas, Alice Crespi, Elena Maines, Stefano Terzi, and Massimiliano Pittore from the Center for Climate Change and Transformation at Eurac Research, Bolzano-Bozen, Italy. This study investigates the increasing intensity and impacts of compound drought and heatwave (CDHW) events in the Adige River basin, with a particular focus on the significant event of May 2022. The authors employ a ranking of CDHW events from 1950 to 2023 using E-OBS data, a flow-analogue attribution approach with ERA5 geopotential height data, and an evaluation of EURO-CORDEX simulations to assess historical changes and future projections. Below, I provide my critical comments and recommendations to enhance the scientific rigor, clarity, and contribution of this work for publication in HESS journal.

1) The abstract and introduction effectively outline the problem, highlight the 2022 CDHW event, and introduce the attribution methodology, making it accessible to a broad audience. The transition from the abstract to the introduction lacks fluidity. The abstract references a ranking of 119 events and the selection of the 2022 event but omits details on the ranking methodology or the rationale for the 1950-2023 timeframe, leaving a disjointed narrative.

2) The abstract briefly mentions the use of E-OBS data, a composite index, and the flow-analogue attribution approach with ERA5 data, but it lacks specificity. For instance, what components constitute the composite index (e.g., temperature, precipitation, spatial extent)? How was the 1-4°C increase in heatwave intensity determined? Providing a brief methodological outline would enhance transparency and allow readers to assess the robustness of the findings upfront.

3) The discussion of atmospheric circulation patterns (e.g., subtropical ridge, warm air from northern Africa) is informative but lacks quantification. Terms like "prolonged periods" and "pronounced precipitation deficits" are vague without supporting data or references to specific magnitudes observed in the Adige basin.

4) The introduction highlights the scarcity of attribution studies at the catchment scale and the unexplored performance of EURO-CORDEX models, which is a strong motivation. However, it does not preview the specific attribution method (flow-analogue approach) or the limitations of EURO-CORDEX simulations (e.g., spatial resolution, parameterization), which are critical for setting expectations.

5) The use of E-OBS and ERA5 data is mentioned, but their resolution and potential biases (e.g., E-OBS's coarse grid in mountainous areas) are not addressed. This is particularly relevant given the Adige basin's complex topography.

6) The introduction cites several studies (e.g., Viviroli et al., 2007; Hao et al., 2022) to establish the importance of the Alpine region and compound extremes but lacks a critical synthesis. For example, it does not address whether previous studies have underestimated snow dynamics or elevation-dependent warming in the Alps, which are highlighted as unique challenges. I strongly recommend considering these two studies: Assimilation of sentinel-based leaf area index for modeling surface-ground water interactions in irrigation districts; Elevation dependent change in ERA5 precipitation and its extremes.

7) The abstract's note that over half of the EURO-CORDEX models failed to reproduce observed changes suggests potential issues with model selection or validation. The introduction does not foreshadow this, which could undermine confidence in the projections.

8) The streamflow story leans on one gauge (Trento) plus HERA; June reductions are attributed largely to earlier snowmelt. Please (i) discuss/quantify confounding from irrigation/hydropower

operations (not just note restrictions), (ii) report whether HERA is “naturalized” or includes management, and (iii) add a simple basin water-balance perspective (snow cover, PET/ET0, soil moisture) to separate supply vs. demand effects.
9) You show earlier snowmelt and an April/May discharge bump followed by June deficits. Consider cross-checking with independent snow data (in situ SWE, satellite snow extent) and add confidence intervals for the reported “30–40 cm per 30y” and “±40–60 m^3/s” trends.
10) Beyond sign/magnitude counts, include formal skill scores (bias, RMSE, correlation, CRPS) for both conditioned and unconditioned reconstructions, and try simple emergent-constraint or performance-based weighting to see if an informed subset reduces the underestimation. Clarify implications of stitching historical with RCP8.5 to 2021.
11) Where you claim significant changes, consistently show effect sizes with CIs. You use Cramér–von Mises for some tests; extend uncertainty quantification to the event ranking, severity composites, and the discharge change maps (e.g., bootstrap over analogues and spatial blocks).
12) Since analogues are conditioned on one pattern, stress-test conclusions by repeating the pipeline for another major CDHW (e.g., 2003/2018) to show the hydrologic timing signal is not event-specific.

This manuscript presents a valuable analysis of compound dry and hot weather (CDHW) events in the Adige River Basin, with the 2022 event serving as a compelling case study. However, to meet the standards of HESS journal, the authors should strengthen the critical synthesis in the introduction, enhance methodological clarity in the abstract, and explicitly discuss the limitations of the data and modeling approach.