Recommendation: Major Revision

This is overall a well written manuscript which investigates historical (1961–2025) and future (2015–2100) wildfire regimes across the Northeast Mediterranean domain using the dynamic global vegetation model (DGVM) LPJ-GUESS coupled with SIMFIRE–BLAZE, forced by ERA5-Land and a five-member CMIP6 ensemble under SSP5-8.5.

While the research question moving beyond domain-aggregate burned area to spatially and temporally resolved fire return intervals (FRI) and probabilities is important, the study has some experimental design flaws, unvalidated model assumptions, and statistical overreach.

Most critically

- In lines 121–123, the author states: "anthropogenic ignitions and fire suppression were excluded, assuming fires arise exclusively from natural ignitions." In the Mediterranean basin, natural ignitions (lightning) account for very few fires. SIMFIRE explicitly contains empirical formulations relating fire occurrence to human population density and cropland fraction.

- In Section 4.1, the author claims that this mismatch is an intentional feature providing a "useful diagnostic of the human imprint". If that's the case you cannot benchmark/validate a model against satellite observations (MODIS MCD64A1) that reflect human ignitions and suppression, obtain a statistically insignificant spatial correlation, and then claim the model is "benchmarked" and suitable for projecting future spatial reorganizations.

- (Lines 163–165): SSP5-8.5 is increasingly viewed in climate science as an extreme high-end stress test rather than a business-as-usual pathway. Evaluating future fire regimes only under SSP5-8.5 without a plausible mid-range mitigation scenario (such as SSP370) and an optimistic one (SSP126) limits the policy and management utility of this work.

- (Lines 210–218): The manuscript mentions "outputs from five GCMs (CMIP6, SSP5-8.5)" but never names these five models anywhere in the main text. The author should list the models, their institutions, their spatial resolutions, and their specific climate sensitivities.

- (Lines 110–111, 439–446): The manuscript evaluates fuel availability using FAPAR. FAPAR saturates rapidly and does not differentiate between live overstory foliage, dead fuel accumulation, or understory fine fuels. Why did the author use a satellite-style proxy (FAPAR) rather than analyzing the actual fuel mass modeled by BLAZE?

Specific Discrepancies, Typos, and Inconsistencies

- Line 336 vs. Table A1: The caption for Figure 6 lists "Caspian lowland desert [727]". However, Table A1 lists Caspian lowland desert as [815], while [727] is the Eastern Anatolian montane steppe.
- The satellite observation record is referred to as 2000–2025 (Line 99), 2001–2024 (Line 286, Line 416), 2001–2025 (Figure 2, Line 294), and 2002–2020 (Line 276). The author must standardize the observational period across the entire manuscript. Figure A1 title states: (2001–2024), but the x-axes run from 2000 to 2025.

Required Revisions for Resubmission

1. Revise the Experimental Architecture (Run Anthropogenic On vs. Off) The author cannot evaluate model performance against real-world observations without including anthropogenic ignition and suppression parameterizations. I propose simulation 1: Full Anthropogenic Baseline (SIMFIRE with population, land-use, suppression enabled). Simulation 2: Potential Natural Fire Regime (Anthropogenic drivers excluded). Only by contrasting these two runs can the author genuinely isolate and quantify the "human imprint" or "suppression deficit."

2. Add sustainable/mitigation scenarios (SSP126 and SSP370) to provide a valid comparative basis for climate policy. Explicitly list all five CMIP6 models in a designated table in the main text.

3. Replace FAPAR with Direct BLAZE Biomass/Fuel Variables, directly exported from LPJ-GUESS.