This manuscript introduces a newly developed fully coupled atmosphere–ocean–sea ice model, GRIMs–NEMO v1.0, and evaluates its performance in simulating the boreal summer climate with emphasis on the East Asian summer monsoon (EASM). The topic is relevant, the computational-efficiency comparison with CESM2 is a useful practical contribution, and the three-experiment design (CPL, ATM, ATM_CSST) is a sensible way to isolate air–sea interaction effects. However, several issues need to be addressed before the manuscript can be considered for publication. The most important concern the completeness and reproducibility of the model description, the fairness and interpretation of the CESM2 computational comparison, the physical interpretation of the identified biases, the strength of the conclusions relative to the evidence, and the overall language, notation, and typographical consistency.

Major comments:

1. The manuscript does not provide enough information for readers to reproduce or properly interpret the simulations. It is unclear what the prescribed SST source is for ATM, how the atmospheric initial conditions are specified, how the ocean and sea ice are initialized, how the coupler fields are regridded and what coupling frequency and field list are used beyond "every hour," and what the exact NEMO configuration (ORCA025? tripolar? bathymetry?) and SI3 settings are. The manuscript also does not state the length of the spin-up, whether any flux correction or SST restoration is applied, or how the 1970–2005 historical forcing is harmonized with the 2014–2023 EASM experiments. In addition, several model-component descriptions are incomplete: the "double fourier Series" should be "double Fourier series"; KSAS and TKE are not spelled out at first use; the vertical coordinate and model lid of the atmospheric model are not stated; and it is unclear whether the exclusion of the biogeochemical module affects air–sea CO_2 fluxes or any coupling fields. These omissions make it difficult to judge whether the reported biases are model-intrinsic or configuration-dependent.

2. The manuscript identifies several systematic biases—excessive equatorial western Pacific precipitation, cold surface temperature biases, weakened Tibetan Plateau heating, and circulation errors over the western North Pacific—but the physical explanations remain largely speculative. For example, the link between the Noah land surface model version 2.7 and the Tibetan Plateau cold bias is asserted rather than demonstrated; the connection between the cold bias and the negative geopotential height bias is plausible but not quantified; and the attribution of the equatorial precipitation bias to warm SST biases and enhanced surface heat fluxes is not supported by a quantitative heat-budget or moisture-budget analysis. The manuscript would benefit from a more mechanistic diagnosis, even if only for one or two key biases.

3. The three-experiment design is a strength, but the manuscript does not clearly state what each comparison isolates. CPL vs ATM confounds air–sea coupling with SST bias; CPL vs ATM_CSST isolates coupling effects given the same SST; ATM vs ATM_CSST isolates the effect of prescribed versus interactive SST. The manuscript should state explicitly which comparison addresses which question, and should acknowledge that ATM_CSST, by prescribing coupled-model SSTs, inherits the coupled model's SST biases and therefore cannot fully separate coupling effects from SST-bias effects. It is also unclear whether ATM_CSST uses the same SST field as CPL at every time step or a monthly climatology. The conclusion that "air–sea interactions improve the EASM rainband" is therefore stronger than the experimental design supports.

4. Statements such as "GRIMs–NEMO shows reasonable capability as a computationally efficient, fully coupled climate model" and "sufficient capability for use in climate- and weather-related studies" are broader than what a single 1980–2005 historical simulation and a 2014–2023 EASM experiment can support. The manuscript does not evaluate the model's performance in other seasons beyond a brief mention, does not assess ENSO teleconnections or monsoon onset/withdrawal timing, and does not compare with atmosphere-only GRIMs at the same resolution in a controlled way. The conclusions should be qualified accordingly, and the "low computational cost" advantage should be described as configuration-specific.

5. The PMP-based comparison is potentially useful, but the manuscript does not state how many CMIP5 and CMIP6 models are included, whether the same historical period and forcing are used, how the multi-model statistics are computed, and whether the comparison is fair given differences in resolution and complexity. The statement that precipitation skill is "broadly comparable to those of CMIP5 and CMIP6 models" should be supported by a quantitative summary (e.g., RMSE and PC distributions across models) rather than by visual inspection of Fig. 1 alone. The precipitation bias of "approximately -0.4" should be given in explicit units (e.g., mm day^{-1}) and defined as a global or regional mean.

6. The ENSO, PJ, and BSISO evaluations are informative but largely descriptive. The manuscript reports EOF patterns, explained variance, and periodicity but does not diagnose why the ENSO periodicity is longer (7–8 years vs 3–5 years), why the PJ pattern is displaced southward, or why BSISO propagation over inland India is weaker. Given that these biases are likely linked to the same mean-state biases discussed in Sect. 4.1, a short mechanistic discussion linking the variability biases to the mean-state biases would substantially strengthen the section. In addition, it should be stated how the periodicity is estimated (spectral analysis, autocorrelation) and whether the EOFs are computed over the same domain and season in both model and observations.

Minor comments:

1. Introduction: Abbreviations such as KSAS, TKE, PMP, and IVT should be defined at first use, and "summertime" versus "boreal summer" should be used consistently.
2. In Sect. 2: Please confirm the official English name of the Republic of Korea Air Force and the atmospheric model top and vertical coordinate should be stated.
3. In Sect. 3.1: Please provide the PMP version number and the exact metrics used; state which variables are initialized from ERA5 and which from ORAS5.
4. In Sect. 3.2: "(E.U. Copernicus Marine Service Information, 2026)" appears to contain an incorrect year; please check. Please also state the spin-up period for each experiment and whether the first year is excluded.
5. In Sect. 4.1.1: The precipitation bias "approximately -0.4" should be given with explicit units and defined as global or regional; the global cold bias in Fig. 2e should be specified as surface or column-integrated.
6. In Sect. 4.1.2: The westward extension of eastern Pacific SST variability should be quantified; the method used to estimate ENSO periodicity should be stated; and it should be clarified whether the EOFs are computed over the same domain and season in both model and observations.