Contrasted hindcast performances calls for more realistic models

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While process-based models are expected to provide better species range shift predictions under novel environmental conditions than correlative approaches, this hypothesis has yet to be properly tested.

We used both process- and correlative-based species distribution models to hindcast the range shift of xxx tree species across Europe since 12,000 years BP and evaluate the model outputs against fossil pollen records. . We then evaluate prediction uncertainties under future climate change.

We show that long-term hindcast decrease overall model performances and even the most promising approach is unlikely to provide any reliable projections under future non-analogues conditions.

Our results (*i*) challenge the concept of transferability in species distribution modelling, (*ii*) highlight the main principle ensuring model robustness and (*iii*) provide a promising framework to scale up complex models and promote their use in an ever-changing world.