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Astronomical forcing on Eastern and Southern Asia interglacial climates based on modelling results

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The long-term orbital changes have been proved to produce changes in global and regional climate, which are reflected in the geological records. However, the relationships between climate and astronomical parameters are not yet fully understood at regional scale. Here, based on climate model simulations, we study the climate response of several sub-regions over Eastern and Southern Asia to continuously changing astronomical parameters under interglacial conditions (MIS-1, MIS-5, MIS-9, MIS-11 and MIS-19). The outputs are obtained with two methods. The first one is based on the transient simulations using the model LOVECLIM driven by varying insolation forcing (Yin and Berger, 2015). The second one is a Gaussian process emulator (Araya-Melo et al., 2015) calibrated on an ensemble of well-chosen snapshot simulations by the model HadCM3. Data are obtained under the conditions that obliquity is fixed, precession is fixed and all the three parameters vary. The results obtained by the two models are generally consistent. Among the three orbital parameters, precession is the main factor regulating temperature and precipitation, and obliquity is a secondary effect. In general, the relative effects of the three astronomical parameters are quite similar over the selected sub-regions over Eastern and Southern Asia although differences exist. In order to quantify the individual and combined effects, more sensitivity experiments and regression analysis will be carried out.